Chemical Age

SOVIET CHEMICAL INDUSTRY (page 1099)

VOL. 78 No. 2006

21 December 1957

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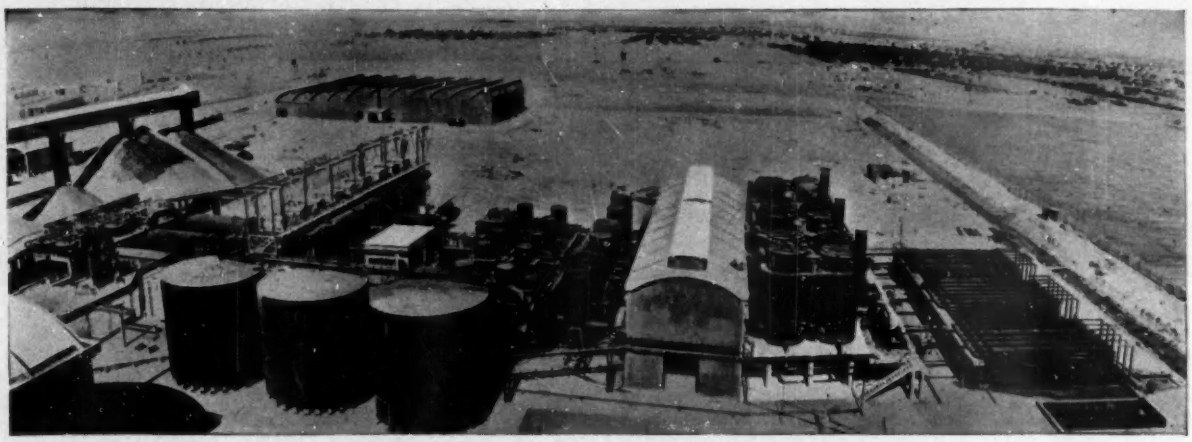

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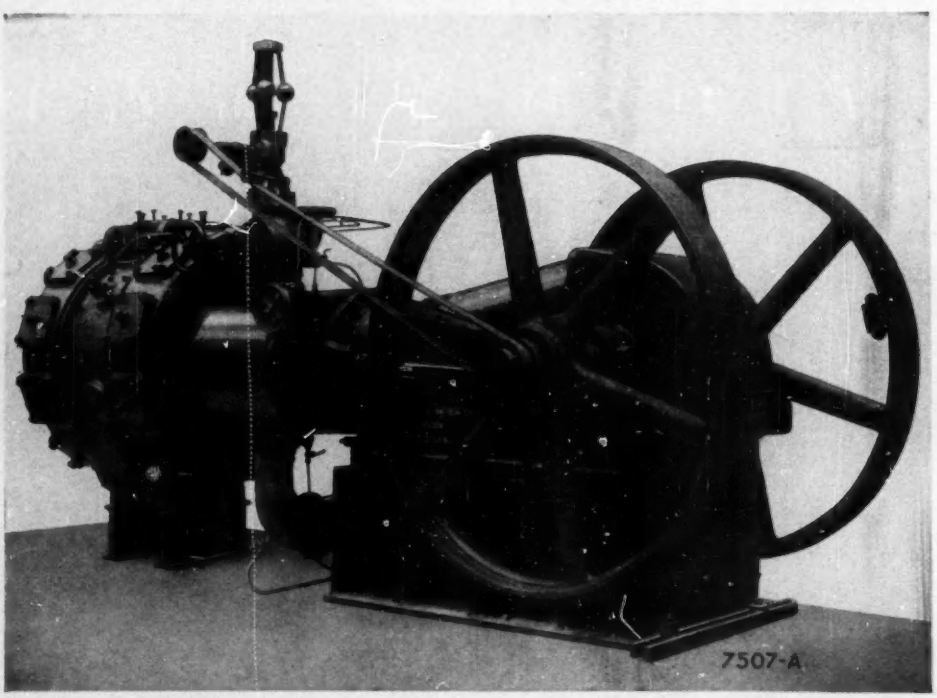

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INDEX TO ADVERTISERS

The first figures refer to advertisement in Chemical Age Year Book, *the second to the current issue*

Page		Page
229	A.P.V. Co., Ltd., The	Front cov.
344	Acalor (1948) Ltd.	—
209	Accrington Brick & Tile Co., Ltd., The	—
176	Adequate Weighers Ltd.	—
	Aero Research Ltd.	—
223	Aimer Products Ltd.	—
159	Albany Engineering Co. Ltd., The	—
	Alexander, Herbert, & Co., Ltd.	—
165	Allen, Edgar, & Co., Ltd.	—
364	Alumina Co., Ltd., The	cov. iii
328	Amalgamated Oxides (1939) Ltd.	—
306	Armour & Co., Ltd.	—
G/Cd.	Ashmore, Benson, Pease & Co.	—
189	Ashworth, Arthur, Ltd.	—
	Associated Lead Mfrs. Ltd.	—
G/Cd.	Audley Engineering Co., Ltd.	—
146	Autometric Pumps Ltd.	—
212	B. A. Holland Engineering Co., Ltd., The	—
282	Baker Perkins Ltd.	—
324	Baker Platinum Division, Engelhard Industries Ltd.	—
233	Balfour, Henry, & Co.	—
210	Barclay Kellett & Co., Ltd.	—
	Bell, G., & Sons, Ltd.	—
250	Bennett, Sons & Shears Ltd.	—
G/Cd.	Berk, F. W. & Co., Ltd.	—
242	Beryllium & Copper Alloys (Safety Tools) Ltd.	—
	Bivac Air Co. Ltd.	—
270	Black, B., & Son, Ltd.	—
2	Blackman Keith Ltd.	—
204	Blundell & Crompton Ltd.	—
148	Borax Consolidated Ltd.	—
	Borax & Chemicals Ltd.	—
289	Boulton, William, Ltd.	—
228	Bowmans Chemicals Ltd.	—
270	Braby, Fredk., & Co., Ltd.	—
183	Bramigk & Co., Ltd.	—
	British Acheson Electrodes Ltd.	—
224	British Arca Regulators Ltd.	—
217	British Carbo Norit Union Ltd.	—
	British Ceca Co., Ltd., The	—
216	British Chrome & Chemicals Ltd. (London)	—
230	British Chrome & Chemicals Ltd. (Lancs)	—
	British Drug Houses Ltd., The	—
	British Geon Limited	—
8	British Industrial Solvents	—
236	& 237 British Laboratory Ware Association Ltd.	—
275	British LaBour Pump Co., Ltd.	—
240	British Lead Mills Ltd.	—
360	British Railway Traffic & Electric Co. Ltd.	—
Spine	British Resin Products Ltd.	—
172	British Rototherm Co., Ltd., The	—
227	British Steam Specialties Ltd.	—
168	British Tar Products Ltd.	—
	British Thomson-Houston Co. Ltd.	
170	British Titan Products Co., Ltd.	—
397	Broadbent, Thomas, & Sons, Ltd.	—
231	Brotherhood, Peter, Ltd.	—
244	Brotherton & Co., Ltd.	—
	Brough, E. A., & Co., Ltd.	—
234	Browns Foundry Co., Ltd.	—
218	Brush Design Group, The	—
175	Bryan Donkin Co., Ltd., The	—
180	Buell (1952) Ltd.	—
272	Burnett & Rolfe Ltd.	—
	Burndept Ltd.	—
	Buss Ltd.	—
	Butterworths Scientific Publications	—
201	Butterfield, W. P., Ltd.	—
160	Calder Vale Glassworks Ltd.	—
	Callow, F. E. (Engineers) Ltd.	—
	Callow Rock Lime Co. Ltd., The	—
	Cambridge University Press	—
354	Candy Filter Co. Ltd., The	—
	Cannon (G. A.) Ltd.	—
238	Carbon Dioxide Co., The	—
280	Carmichael, John R., Ltd.	—
243	Catalin Ltd.	—
	Chapman & Hall Ltd.	—
	Chemical Construction (Great Britain) Ltd.	—
191	Chemical Workers' Union, The	—
	Chemicals & Feeds Ltd.	—
318	Chemitrade Ltd.	—
284	Chesterfield Tube Co., Ltd., The	—
	Chimimport	—
203	Ciech (Poland)	—
264	Cinema Television Ltd.	—
224	Clark, T. C., & Co., Ltd.	—
	Classified Advertisements	1030, 1031
258	Clayton Dyestuffs Co. Ltd., The	—
199	Clayton, Son & Co., Ltd.	—
288	Clydesdale Chemical Co. Ltd.	—
285	Clyde Tube Forgings Ltd.	—
213	Cole, R. H., & Co., Ltd.	—
208	Cole & Wilson Ltd.	—
204	Collins Improved Firebars Ltd.	—
	Colt Ventilation Ltd.	997
	Colvin-Smith Ltd.	—
348	Comet Pump & Eng. Co. Ltd., The	—
	Constable & Co.	—
	Controlled Convection Drying Co.	—
	Constructors John Brown Ltd.	—
4	Crofts (Engineers) Ltd.	—
	Cromil & Piercy Ltd.	—
171	Cruickshank, R., Ltd.	—
334	Curran, Edward, Engineering Ltd.	—
304	Cyanamid Products Ltd.	—
222	Cyclops Engineering Co. Ltd., The	—
288	Cygnet Joinery Ltd.	—
286	Danks of Netherton Ltd.	—
216	Davey, Paxman & Co., Ltd.	—
	Dawson, McDonald & Dawson Ltd.	—
170	Derby Luminescents Ltd.	—
	Distillers Co., Ltd., The	—
161	Dorr-Oliver Co., Ltd.	—
280	Douglas, William, & Sons Ltd.	—
200	Dowlow Lime & Stone Co., Ltd., The	—
	Dring & Fage Ltd.	1000
174	Drummond Patents Ltd.	—
195	Dryden, T., Ltd.	—
	Dunlop Rubber Co., Ltd.	—
	Dutt, P. K., & Co., Ltd.	—
232	E.D.C., Ltd.	—
330	Edison Swan Electric Co., Ltd., The Electric Resistance Furnace Co. Ltd.	—
268	Electronic Switchgear (London) Ltd.	—
244	Electrothermal Engineering Ltd.	—
B/Mk.	Elliott, H. J., Ltd.	—
	Emcer Products	—
	Enamelled Metal Products Ltd.	—
166	English Glass Co., Ltd., The	1031
G/Cd.	Erinoid Ltd.	—
207	Evered & Co., Ltd.	—
	Evershed & Vignoles, Ltd.	—
	Fairey Aviation	—
280	Farnell Carbons Ltd.	—
	Fawcett Finney Ltd.	—
	Ferraris, Fred, Ltd.	—
202	Ferris, J. & E., Ltd.	—
	Fleischmann (London) Ltd.	—
220	Film Cooling Towers (1925) Ltd.	—
253	Foxboro-Yoxall Ltd.	—
	Foxflex Ltd.	—
	Fraser, W. J., & Co., Ltd.	—
298	Fuller's Earth Union Ltd., The	—
188	Gallenkamp, A., & Co., Ltd.	—
	Gas Council, The	—
266	Geigy Pharmaceutical Co., Ltd.	—
	General Electric Co., Ltd.	—
	Glebe Mines Limited	—
	Goodyear (Export Div.)	—
290	Graviner Mfg. Co., Ltd.	—
265	Grazebrook, M. & W., Ltd.	—
164	Greeff, R. W., & Co., Ltd.	—
192	Grindley & Co., Ltd.	—
232	Hackbridge & Hewittic Electric Co., Ltd.	—
202	Haller & Phillips Ltd.	—
214	Hanovia Lamps	—
	Hanson Books	—
206	Harris (Lostock Gralam) Ltd.	1028
222	Haworth, F. (A.R.C.) Ltd.	—
158	Hearson, Charles, & Co., Ltd.	—
238	Herbert, Alfred, Ltd.	—
	Hickson & Welch Ltd.	—
193	Holroyd, John, & Co., Ltd.	—
234	Honeywill & Stein Ltd.	—
248	Hopkin & Williams Ltd.	1029
187	Humphreys & Glasgow Ltd.	—
310	Huntington, Heberlein & Co. Ltd.,	—
310	I.C.I. Billingham Organic	999
	I.C.I. General Chemicals Solvents	—
	I.C.I. Plastics—Darvic	—
	I.C.I. Plastics—Fluon.	—
	I.C.I. Ltd. (Plastics Div.), Corvic	—
	I.C.I. (Florube) Ltd.	1003
	Imperial Chemical Industries Ltd.	—

continued on page 1000

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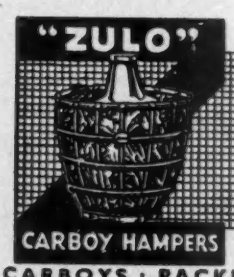

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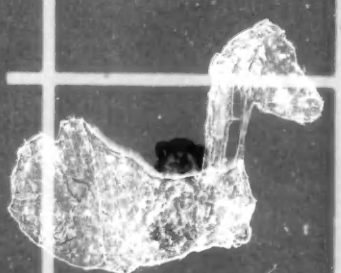

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ICI

INDEX TO ADVERTISERS

The first figures refer to advertisement in Chemical Age Year Book, *the second to the current issue*

Page		Page
157	Imperial Smelting Corporation (Sales) Ltd.	—
	Industrial & Marine Protective Applications Limited	—
	Industrial Tapes, Ltd.	—
	International Combustion Group	—
	Isopad Ltd.	—
246	Jackson, Henry (Liverpool) Ltd.	—
214	Jackson, J. G., & Crockatt Ltd.	—
245	Jenkins, Robert, & Co., Ltd.	—
249	Jenkinson, W. G., Ltd.	—
3	Jobling, James A., & Co., Ltd.	—
	Johnson, S. H., & Co., Ltd.	—
166	Johnsons of Hendon Ltd.	—
267	Jones, Tate & Co., Ltd.	—
228	K.D.G. Instruments Ltd.	—
178	K. W. Chemicals Ltd.	—
	Kaylene (Chemicals) Ltd.	—
278	Kernick & Son Ltd.	—
395	Kestner Evaporator & Engineering Co., Ltd.	1002
395	Kestner Evaporator & Engineering Co., Ltd. (*Keebush*)	—
	Kestner (Industrial Safety) Ltd.	998
	Key Engineering Co., Ltd., The	—
283	Kier, J. L., & Co., Ltd.	—
271	Kleen-e-ze Brush Co., Ltd.	—
206	Lankro Chemicals Ltd.	—
210	Laporte Chemicals Ltd.	—
184	Lavino (London) Ltd.	—
252	Leda Chemicals Ltd.	—
264	Leek Chemicals Ltd.	—
162	Leigh & Sons Metal Works Ltd.	998
	Lennig, Charles, & Co. (Great Britain) Ltd.	—
	Lennox Foundry Co., Ltd.	—
219	Light, L., & Co., Ltd.	—
274	Lind, Peter, & Co., Ltd.	—
Cover	London Aluminium Co. Ltd., The	—
	London Containers & Noakes, Ltd.	—
	Longman Green & Co., Ltd.	—
278	Lord, John L., & Son	—
	McCarthy, T. W. & Sons Ltd.	—
190	Machinery (Continental) Ltd.	—
	MacLellan, George Ltd.	—
	Mcgraw Hill Ltd.	—
257	Mallinson & Eckersley Ltd.	—
	Manesty Machines	—
342	Marchon Products Ltd.	—
226	Marco Conveyor & Eng. Co. Ltd.	—
168	Matthews & Yates Ltd.	—
	May & Baker Ltd.	—
173	Measuring & Scientific Equipment Ltd.	—
	Meigh Castings Ltd.	—
Cover	Metal Containers Ltd.	—
	Metafiltration Co., Ltd.	1004
G/Cd.	Metalock (Britain) Ltd.	—
174	Metcalf & Co.	—
	Metropolitan-Vickers Electrical Co., Ltd.	—
178	Middleton & Co., Ltd.	—
	Mills Packard Construction Co., Ltd.	—
215	Mine Safety Appliances Co. Ltd.	—
	Mirrlees Watson Co. Ltd., The	cov. ii
180	Mirvale Chemical Co., Ltd.	—
254	Mitchell Cotts & Co., Ltd.	—
	Mond Nickel Co., Ltd., The	1005
	Monsanto Chemicals Ltd.	1006
	Morgan Crucible Co., Ltd., The	—
200	Moritz Chemical Engineering Co., Ltd.	cov. ii
	Mulberry Co., Ltd., The	—
181	Neckar Water Softener Co. Ltd.	—
268	Nederlandse Emballage Ondeernemming Gebr. de Wilde N.V.	—
221	Negretti & Zambra Ltd.	—
	New Metals & Chemicals Ltd.	—
	Newnes, George Co., Ltd.	—
276 & 277	Newton Chambers & Co. Ltd.	—
239	Nicolson, W. B. (Scientific Instruments) Ltd.	—
177	Nordac Ltd.	—
211	North Thames Gas Board	—
194	Northern Malleable Foundry Co., Ltd., The	—
179	Northey Rotary Compressors Ltd.	—
	Nu-Swift Ltd.	—
	Orr Products Ltd.	—
	Oxirane Ltd.	1001
296	Palfrey, William, Ltd.	—
	Paper Good Manufacturing Co., Ltd.	—
	Pascall Engineering Co. Ltd., The	cov. iii
6	Paterson Engineering Co. Ltd., The	—
287	Peabody Ltd.	—
	Penrhyn Quarries Ltd.	—
320 & 368	Permutit Co., Ltd., The	—
G/Cd.	Petrocarbon Developments Ltd.	—
	Polypenco Ltd.	—
340	Pool, J. F., Ltd.	—
	Potter, F. W. & Soar Ltd.	—
	Pott, Cassels & Williamson	—
358	Powell Duffryn Carbon Products Ltd.	—
G/Cd.	Power-Gas Corporation, Ltd., The	cov. iv
169	Price Stutfield & Co., Ltd.	—
	Prodorite Ltd.	—
242	Production Chemicals (Rochdale) Ltd.	—
	Prudential Assurance Co. Ltd., The	—
261	Pye, W. G., & Co., Ltd.	—
	Pyrethrum Board of Kenya	1027
	Q.V.F. Ltd.	—
314	Reads Ltd.	—
	Rediweld Ltd.	—
	Richmond Welding Co., Ltd.	—
	Robinson, F., & Co., Ltd.	—
G/Cd.	Rose, Downs & Thompson Ltd.	—
230	Rotometer Manufacturing Co. Ltd.	—
167	St. Helens Cable & Rubber Co. Ltd.	—
269	Sandiacre Screw Co. Ltd., The	—
182	Scientific Glass-Blowing Co., The	—
285	Shaw Petrie Ltd.	—
255	Sheepbridge Alloy Castings Ltd.	—
356	Shell Chemical Co., Ltd.	—
256	Siebe, Gorman & Co., Ltd.	—
350	Sigmund Pumps Ltd.	—
	Simon, Richard, & Sons, Ltd.	cov. iii
344	Southern Instruments Computer Division	—
338	Spencer Chapman & Messel Ltd.	—
	Stabilag Co., Ltd., The	—
396	Stanton Instruments Ltd.	—
	Staveley Iron & Chemical Co. Ltd.	—
212	Steel, J. M., & Co., Ltd.	—
	Steel & Cowlishaw Ltd.	—
	Stockdale Engineering Co., Ltd.	1004
	Stonehouse Paper & Bag Mills	—
	Streamline Filters Ltd.	—
	Sturge, John & E., Ltd.	—
251	Sutcliffe Speakman & Co., Ltd.	—
279	Taylor Rustless Fittings Co., Ltd.	—
235	Tenaplas Sales Ltd.	—
218	Thermal Syndicate Ltd., The	—
196	Thomas & Bishop Ltd.	—
	Thomason, W., & Sons, Ltd.	—
145	Thompson, John (Dudley) Ltd.	—
	Todd Bros. (St. Helens & Widnes) Ltd.	—
198	Towers, J. W., & Co., Ltd.	—
197	Trent Valve Co., Ltd.	—
160	Tungstone Products Ltd.	—
259	Unifloc Ltd.	—
	Unilever Ltd.	—
	United Coke & Chemicals Co. Ltd.	—
247	United Filters & Engineering Ltd.	—
	United Kingdom Atomic Energy Authority	—
	Vaughan Crane Co., Ltd.	—
192	W.E.X. Traders Ltd.	—
241	Walker Extract & Chemical Co. Ltd.	—
	Wallach Bros. Ltd.	1002
263	Waller, George & Sons Ltd.	—
161	Walley, A. L.	—
162	Wallis, Charles, & Sons (Sacks) Ltd.	—
	Ward, Thos. W., Ltd.	—
185	Watson, Laidlaw & Co., Ltd.	—
	Weinrebb & Randall Ltd.	—
260	Wells, A. C., & Co., Ltd.	—
182	Wengers Ltd.	—
217	Whessoe Ltd.	—
	Whiffen & Sons Ltd.	—
196	Whitaker, B., & Sons Ltd.	—
163	Widnes Foundry & Engineering Co., Ltd.	—
	Wilkinson, James, & Son, Ltd.	—
186	Wilkinson Rubber Linatex Ltd.	—
273	Willcox, W. H., & Co., Ltd.	—
194	Williams, & James (Eng.) Ltd.	—
172	Wilson, Edward, & Son Ltd.	—
268	Wilde, Gebr. De Nederlandse Emballage Ondernemming N.V.	—
220	Wood, Harold, & Sons Ltd.	—
184	Worcester Royal Porcelain Co., Ltd., The	—
	Worthington-Simpson Ltd.	—
281	Wynn (Valves) Ltd.	—
225	Yorkshire Tar Distillers Ltd.	—
226	Zeal, G. H., Ltd.	—

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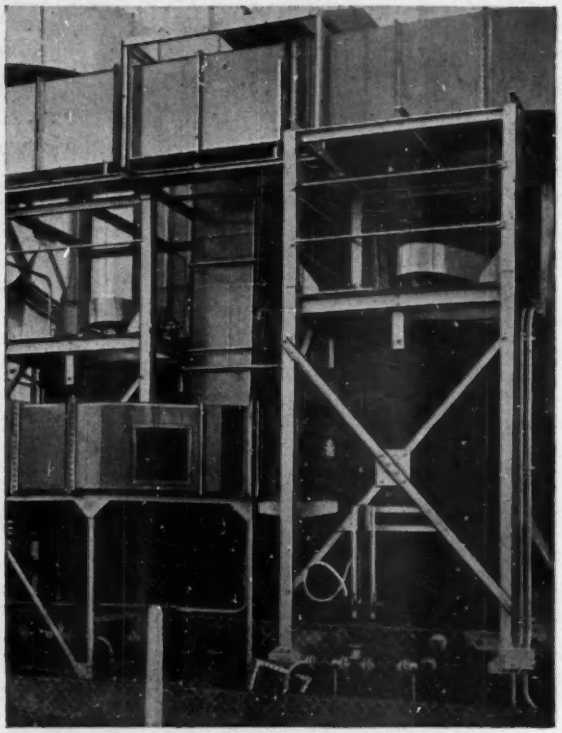

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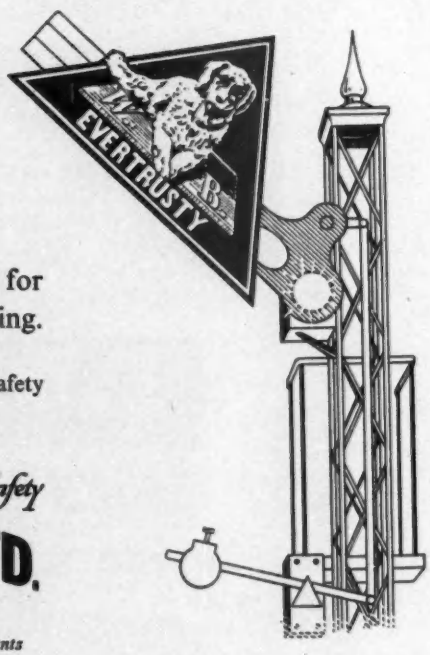

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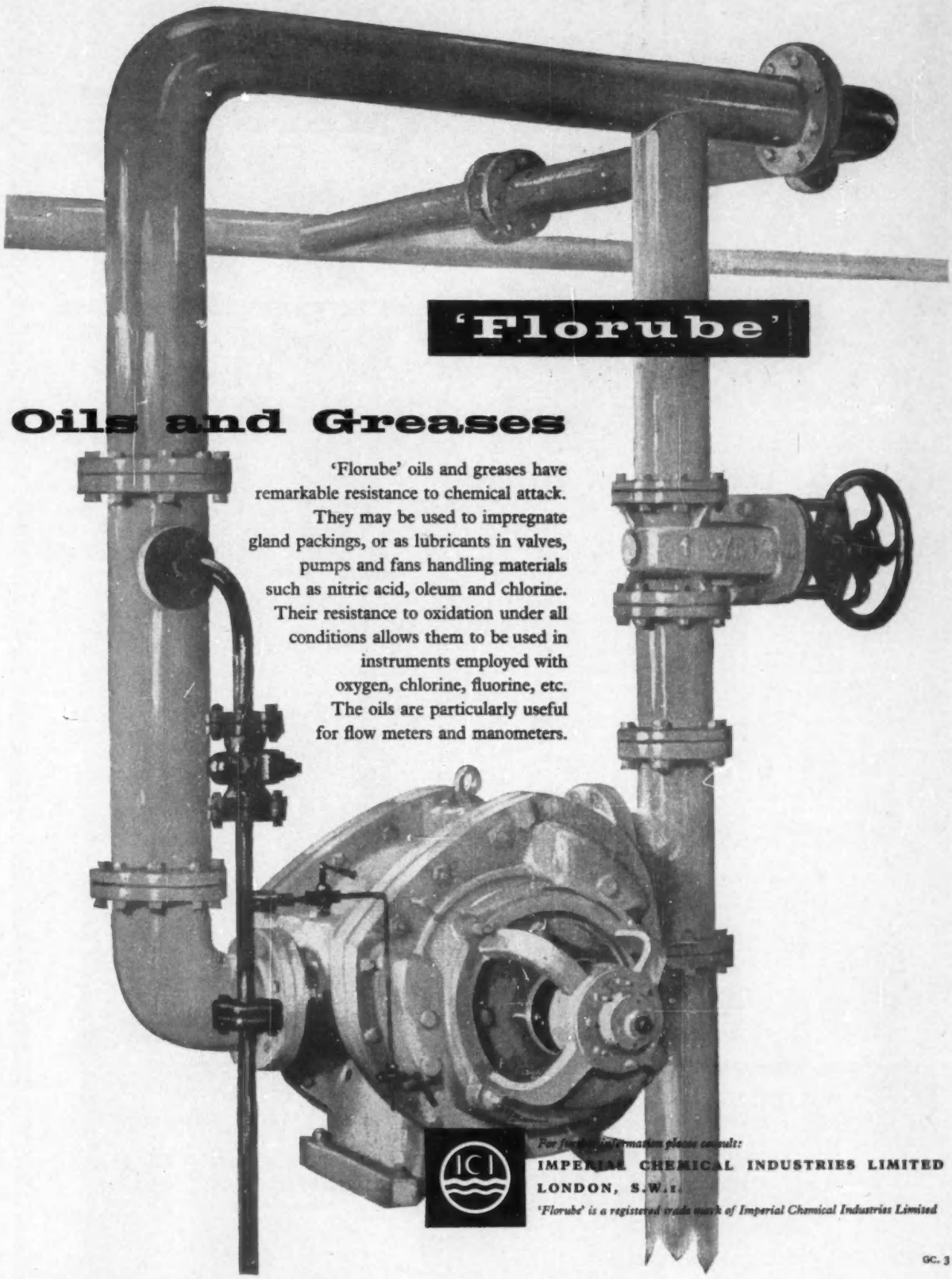

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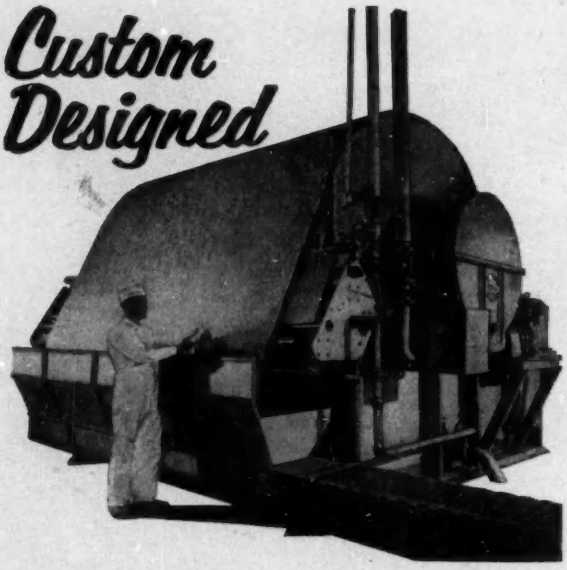

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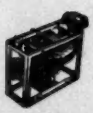

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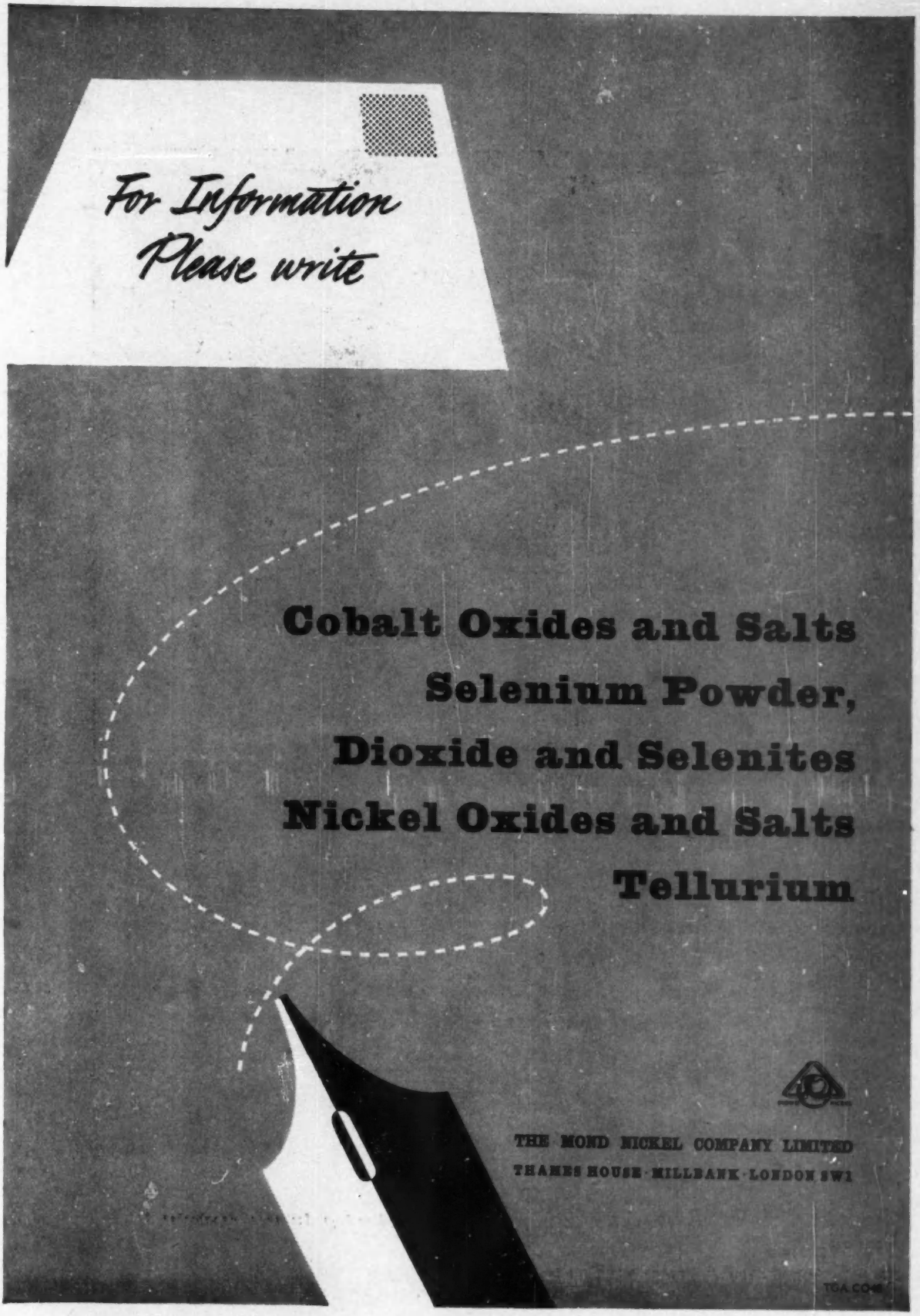
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IN THIS ISSUE

Petrochemicals in Austria	1008
Acetylene-Derived Chemicals	1008
Soviet Chemical Industry	1009
Distillates	1010
MPs Discuss 'Know-How' Bill	1011
Cumene-Phenol Plant Planned	1012
Analysis in Biochemistry	1013
Chemicals in Austria and Japan	1015
Indian Newsletter	1017
Coal Tar Research Reviewed	1019
Odorant for Hydrocarbon Gases	1020
Overseas News	1021
People in the News	1023
Commercial News	1025
Market Reports	1025
Chemical Stocks and Shares	1026
Trade Notes	1026
New Patents	1028

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AUSTRALIA'S RESEARCH

SCIENTIFIC research in Australia has been a most profitable investment for the country and the dividends to the people have been very great. So stated Mr. R. G. Casey, Minister in charge of the Commonwealth Scientific and Industrial Research Organisation, in a recent statement. He regretted, however, that so many Australian industries should leave research to the Government and do so little research themselves.

A recent survey in Australia has shown that Australian industry spends at the most three pounds per thousand of turnover on research and development, compared with the 15 and 20 pounds respectively for the UK and the US. Every Commonwealth Government has, since 1920, consistently and generously supported scientific research. While other agencies are used, the Government is now carrying out scientific research in a wide range of primary and secondary industries through the Commonwealth Scientific and Industrial Research Organisation (CSIRO).

Studies on the trace elements in soils by CSIRO have led to increased production on many Australian farms. Academic studies on 'rare' minerals have resulted in the development of the Australian beach industry, titanium metal and thorium and zirconium. Abstract research in surface chemistry has led to revolutionary processes for the wool industry and to the possibility of inhibiting the evaporation of Australia's meagre water supplies.

All these results of CSIRO research have helped Australian industry. The CSIRO laboratories are kept busy with enquiries from industry. But it is evident that while industry is gaining a great deal from Government research, it is true to say that Australian industry would get ahead much more rapidly if it carried out some part of its scientific research itself. Mr. Casey even goes so far as to say that 'with a few notable exceptions there is a lamentable lack of interest in promoting fundamental or even applied scientific research in Australian industry.'

One of the notable exceptions is the sugar industry. Others who appear to be favourably regarded are ICI ANZ, Nicholas Laboratories and several others, who have large and well-equipped laboratories.

It is realised that, at present, the Australian Government is the only body with the resources necessary to undertake research on atomic energy and for carrying out the large-scale and continuing basic research necessary for maintaining Australia's physical, chemical, engineering and biological standards. But, as Mr. Casey points out, it is not the responsibility of the Government to bear the cost of extensive research in aid of any one company or any one small sector of industry. It is understood that the Australian Government is perfectly willing and even anxious to carry out research for which it alone is equipped. The suggestion is made, however, that the individual industry for which this research is done should bear the costs. It is further suggested that, as a first step, individual branches of secondary industry should recoup the Government for specific research done on their account. Then, in due course, each industry should carry out its own specialised research, leaving fundamental research to the appropriate Government section. Until this state of affairs is reached, however, industry will have to realise that research pays dividends.

PETROCHEMICALS IN AUSTRIA

PLANS for the establishment of a petrochemical industry in Austria have come much nearer fruition as a result of a decision by Oesterreichische Mineralöl-Verwaltungs AG (OMV), a State-owned enterprise, to erect a 2,500,000-ton oil refinery. This refinery will probably be situated on the Danube and be in full operation by 1961. Allowance has been made in the refinery design for the chemical utilisation of refinery gases, especially for the production of ethylene and plastics.

The possibilities of an Austrian petrochemical industry have been closely studied ever since the great powers agreed on restoring Austrian independence and the country regained control of its mineral oil and natural gas deposits. Oesterreichische Stickstoffwerke AG, Linz, set up a special study group to investigate the technical as well as the commercial and economic aspects of such a venture, and this group concluded its work some six months ago. By that time the company had already taken a positive decision in principle as regards the desirability of proceeding with the petrochemical scheme, carried out laboratory tests and preliminary planning, and established contact with various foreign interests.

While it was considered that Austria's own hydrocarbon deposits provided a favourable raw material base owing to their comparative lack of sulphur, it emerged at an early stage that in order to keep the capital expenditure down it would be better to rely on refinery by-products rather than on natural gas as the raw material the more so as the Austrian market does not at present offer a wholly satisfactory outlet for the kerosene fraction which is now chiefly added to the gas oil.

As Austria lacks the financial resources for extensive research in the comparatively small field of petrochemicals, it was also decided for the outset that 'continuous know how' would have to be secured from abroad but some difficulty appears to have been met in this respect because the Austrian group insisted on retaining a majority interest even in the study company to be set up. This condition was in the end accepted by Montecatini, negotiations with other foreign interests having proved abortive.

The first major product of the Austrian petrochemical industry will be ethylene which will be used for the production of polythene, ethylene oxide and similar products. The production of propylene, butadiene and aromatic hydrocarbons is also envisaged but will follow at a later stage in order to keep down the initial capital needs. Vereinigte Stickstoffwerke and OMV are the only Austrian companies so far mentioned as interested in the venture but participation is open to others and a public issue is not excluded.

EIU ON PATENTS

LAST week in these pages we considered many points discussed in the Economist Intelligence Unit's report. Space did not allow a consideration of some other matters of interest in regard to a Free Trade Area.

Of particular interest are invisible earnings. Although the trading position in the UK chemical industry cannot be measured by direct receipts and payments alone invisible earnings add substantially to its contribution to the balance of payments. EIU instances ICI's £6.25 million up to the end of 1955 from receipts on account of its polythene patents and processes alone. Given successful research in the first place, it is often more profitable to licence or sell patents outright, then to rely solely on increasing direct exports. More frequently, licences to use British patents are granted to overseas subsidiaries of British companies or to overseas concerns in which British companies have a joint interest. An example of this is in the production of petroleum chemicals in the Netherlands, in Germany and in France, by companies such as Royal Dutch-Shell, and British Petroleum. Obviously, when part of the profits come back to Britain the rise of the German petrochemical industry, for example, becomes less of a menace.

Registration requirements for drugs, etc., are not in principle incompatible with free trade, state the EIU, but this form of legislation does provide Continental countries with a means of discriminating against imported chemicals in a manner which it is extremely difficult to prove. Under the rules of the CM this discrimination by legislation would be eliminated and it is the intention to include a similar measure in the FTA treaty. It is pointed out, quite rightly, by EIU, however, that how such elimination of discrimination could be carried out in practice is another matter. In the UK there is little discrimination in these fields. Here, the answer, for the British pharmaceutical industry and the fertiliser, insecticide and pesticide industries lies in research to develop new and better products to offset imports.

In this class of chemical products there is also the question of patents. At present there is still unequal patent legislation, particularly for pharmaceuticals, so that the British patentee is not given adequate protection for his product. A similar problem, EIU states, is involved in the practice of some European countries, including the UK, of granting 'licences of right' whenever a patent has remained unworked for a period of some years. The logical answer suggested is the treatment of the FTA as a single market requiring a single patent to be granted by a central authority and valid throughout the area.

NEW ACETYLENE CHEMICALS

AS a result of research carried out by Dr. John Biel, of Lakeside Laboratories, Milwaukee, US, it is believed that new industrial chemicals from acetylene are possible.

The new acetylene chemicals in question are described as unsymmetrical substituted diamines. Due to the high pressures required in the classical methods of preparation of these chemicals they have not been made commercially or even in research quantities previously.

First stage in the process is the reaction of an amine—e.g. dimethyl amine, with propargyl bromide which contains the triple-bond acetylenic linkage. The corresponding propargyl amine is formed. This material is reacted with sodamide in toluene to form a sodium derivative. The latter is then reacted with a halogen-substituted amine to split off the sodium halide and form a diamino alkyne, from which can be produced corresponding diamino derivatives—alkenes, alkanes, ketones, alcohols, esters, etc.

Lakeside Laboratories are evaluating various derivatives for possible pharmaceutical value, but the process, subject of a pending patent application, is expected to find applications in many other fields, for from the derivatives could come many new solvents, plasticisers, detergents, insecticides and polymers.

A Happy Christmas
and
Prosperous New Year
to all our Readers

LACK OF CO-ORDINATION IN SOVIET CHEMICAL INDUSTRY

Minister's Report Reveals Friction

SOME of the effects of the recent re-organisation of control and the tasks of the Ministry for Chemical Industry in the Soviet Union are dealt with in a leading article in the No. 5 issue (July–Aug.) 1957, of *Khim. Promyshl.* (Chem. Ind.) by S. M. Tikhomirov, the new Minister for Chemical Industry. Though but little time has elapsed since the reorganisation of control came into force (1 July) some positive results can be recorded.

The examples cited reveal a curious state of affairs prevailing hitherto in some cases. Thus, for a long time it has not been possible to increase the capacity of the Rustavsk nitrogen fertiliser factory because the Minister of Ferrous Metallurgy refused to increase supplies of coke oven gas from the local smelting (metallurgical) works. But now that both these undertakings are under the control of one SNKh (Council of National Economy) for the whole district the necessary supplies of gas can be made available, 'so that the State will obtain additional supplies of mineral fertiliser with considerably less expenditure of capital than would be involved in the erection of a new nitrogen plant.'

A somewhat similar case is reported also from Armenia involving a copper smelting and sulphuric acid factory, where there have been prolonged arguments as to the composition and amount of concentrate and sulphur gases that one plant should obtain from the other.

Lack of Co-operation

Another example is that of supplies of raw material for synthetic rubber from the petrochemical factories, where again there has been much friction and lack of co-operation. The number of such cases, says the Minister, could indeed be multiplied. He hopes, however, that in a relatively short time, with increased experience of the new controlling bodies (local committees of the SNKh) and possibly their wider powers where needed, many of these difficulties will be overcome. The reaction of these local committees to the Ministry (of chemical industry in this case) is not quite clear, but apparently they will work under or in close collaboration with the Minister, in accordance with Article 13 of the new decree, and with planning authorities and the State Scientifico-Technical Committee.

The most essential condition for the smooth working of industry and building is the right constitution of the plan of production and of the plan of development, both for the whole district and for each individual undertaking, in which all concerned must co-operate, beginning with a particular undertaking or works and ending with the Gosplan (State Planning Commission).

In the chemical industries where there are the most complex inter-relations between different regions and republics, between different branches of chemical industry and so on, the set-up of the right plan has special significance. The Minister of Chemical Industry and the other bodies named are now engaged on this important task, including capital construction (new building) and production plan for 1958. Some essential conditions governing the framing and realisation of these plans are discussed. One of these is that it is impossible to repeat the mistakes made by the December plenary session of the KP (Communist Party) of which some examples are given. (It is not often that the KP plenaries are criticised.)

It is stated somewhat vaguely that the chemical industry plan for 1958 (production and new building) will be based on 'simultaneous co-ordination' of all questions and problems touching the activities of the different SNKh's and republics. This co-ordination will apparently include many different bodies or authorities in each of the various republics of the Union in association more or less with the principal state planning commission. In all it appears to be a little complex and super-bureaucratic.

Minister's Hope

It will be interesting to see how this new form of bureaucracy will work. The Minister is hopeful. Special attention must be given to new building in overtaking the arrears in chemical industry development that have unfortunately accumulated; with particular reference to such important branches as synthetic rubber and alcohol, plastics, artificial fibres, fertilisers, with the raw materials for these—such as carbon black and so on.

It is not very clear what is meant by: 'Whilst the Gosplan SSSR (USSR State Planning Commission)—jointly with individual republic Gosplans and ministries—will decide the appropriate allocation or proportioning for a narrow range of products, it is the function of the Ministry of Chemical Industries and republic Gosplans to deal with such proportionality for all products.'

Another important function of the Ministry is the proper organisation of research, wherein it will have to, among other things, co-operate amicably with the great AN (Academy of Science, USSR). Some of the more or less obvious tasks here are considered, including the establishment of filials or branches of the NII (this might possibly mean Sci. Res. Inst.) e.g. one for artificial fibres in Vladimir, the institute for the tyre industry in Omsk, etc. It is pointed out that an important role in developing and introducing new methods and materials will be played by the Central Works Laboratories and Construction Bureaux, of which the main tasks are briefly indicated; as also of the semi-works scale laboratories. As an example of the latter is mentioned the Kalininsk artificial fibre combine where experimental production of polynitril-acrylic fibre has been introduced under the direction of a branch of the VNIIV.

In conclusion it is stated that the functions of the Ministry under the new re-organisation do not include any concern with the 'operational work' of an undertaking or any intermeddling with its management in the economic field. The Minister's chief business appears to be that of the immediate and future planning and technical development of branches or ramifications (Russ. *otracli*), of development and inauguration of the most modern and effective methods and equipment, and so on; including the work of research and planning bodies and institutes, conferences for exchange of ideas and experience, new construction of works and extensions. The sales or marketing branch (or board) of the Ministry (Glavkhimsbyt) will have specially onerous responsibilities in the proper organising of distribution of chemical products in the national economy. For the discharge of its duties it is essential that both the chemical factories and the SNKh's concerned observe the strict Government regulations (disciplines), including stipulated times for delivery.

It is emphasised that there must be no trace of bureaucratism or red tape in the new organisation of the Ministry and its functions. All matters referred to its officers must be dealt with speedily, completely, and with a deep sense of responsibility.

New Method for Measuring Soil Moisture

A NOVEL method for determining the moisture content of soils is proposed by the Western Province Fruit Research Station, South Africa. The method can be carried out within one minute by means of a neutron technique. The apparatus is operated by one person in the field, enabling several tests to be carried out on a large number of soil positions. The labour-saving advantages of this method are obvious.

A feature of this neutron meter is a radio-active source consisting of 10 milligrams of radium mixed with beryllium powder, this mixture producing 'fast' neutrons to the extent of 130,000 per second of emissions. When the soil is irradiated, collision takes place with various elements which successively slows them down. Hydrogen is the element which is able to do this most effectively, and since most of the hydrogen in soil is in the form of water, the moisture content can be determined by the extent of 'slow' neutrons produced. The report says that the radio-active source is expensive, costing about £130, but for practical purposes it retains its activity almost indefinitely. It will lose half its activity in 1,600 years.

1958 Health Congress

Congress of the Royal Society of Health is to be held at Eastbourne from 28 April to 2 May 1958. A preliminary list of subjects includes problems of world rural sanitation and water pollution.

Unilever Research Grant

The department of physical chemistry at Leeds University has received £300 from Unilever Limited, for research.

★ THE Ashburton Chemical Co., Manchester, have not yet made a final decision on whether they will build a new plant at Glynllifon, near Caernarvon. Negotiations have been going on all this year and Ashburton's have agreed with the county council that if they decide not to build at Glynllifon Park they would underwrite the costs and expenses already involved by both the county council and the Gwyrfai Rural Council.

While a definite decision has not yet been reached, the rural council feel that the indications are sufficiently strong enough to justify them in proceeding to obtain the necessary water order to impound the water likely to be required. A draft order has been submitted to the Ministry of Housing and Local Government for approval.

The important factor which influenced the company 12 months ago to develop in the county was the fact that a supply of water amounting to three million gallons a day was available by an impounding dam within a fairly close distance of the site of the proposed works. The company has undertaken that any effluent would be purified and would be stored in such a way that discharge into the sea would be at the time of the tide agreed with the Sea Fisheries Committee and other interested authorities.

The proposed chemical works were mentioned in the House of Commons last week in a debate on industrial development in Caernarvonshire (see page 1011).

★ A BUILDING intended for use as an ice rink but which was never used for that purpose following damage during an air raid, has been partly taken over by Fisons Ltd. as a fertiliser depot serving north-east Scotland. Fisons, who have rented two-thirds of the building, last week entertained Aberdeen and north of Scotland agricultural and grain merchants at a 'house-warming' party. Mr. J. F. Thom, the firm's Scottish sales manager, attended the opening ceremony. Mr. Ian Macdonald, of Aberdeen, is in charge of the new depot as northern sales superintendent.

★ A NEW series of scholarships to Oxford and Cambridge, to be known as the Trevelyan Scholarships after Dr. G. M. Trevelyan, the historian, have been founded after consultation between a number of industrial concerns and representatives of the two universities and of public grammar schools.

The companies are to provide financial support for the scholarships, each of which are worth £450 a year for three years, with an extension to four years in exceptional circumstances. They will be open to boys of British nationality receiving full-time education at schools in the UK. Awards will be irrespective of parents' income.

Promises of financial support already received from industry ensure that at least 12 or 14 scholarships can be awarded annually at each university for an initial five-year period. First selections will be made in November, 1958, by a committee representing the two universities and industry on an equal basis, with an independent chairman.

★ IT HAS been clear for some time that the day of the great national fair embracing many industries has passed. Just after the war, a number of industries started leaving the British Industries Fair in favour of specialised exhibitions dealing with one particular industry.

This trend which has developed in more recent years has now been confirmed in a recent Federation of British Industries survey which showed that out of 109 trade associations, 105 favoured specialised fairs. Only two showed any decided preference for a general fair. A substantial number said that the scope of specialised fairs should be widened sufficiently to allow for the grouping of the products of allied industries. (For instance the chemical industry might in future years co-operate in an exhibition of chemical plant and equipment.)

The survey also revealed that opinion was about equally divided on the question of whether specialised trade fairs in Britain should be national or international.

The FBI is now to institute a further enquiry to consider what is needed to give specialised fairs the modern exhibition facilities which are required today.

★ THIRTY MINUTES of TV time on the BBC network were last week devoted to the development of Terylene. Aidan Crawley, the commentator, interviewed many ICI personalities including Mr. Rex Whinfield, discoverer of Terylene, Dr. A. Caress, chairman of the fibres division, and the head of the Terylene laboratories at Harrogate, who thought the material would expand its use in tyre cords, conveyor belting and rope.

Crawley took the BBC cameras into the fibres division boardroom to probe Dr. Caress and fellow directors on their decision to expand production, the basis for the decision and how it was received by the main board. He was told the division tried to estimate demand five years ahead; that the five-year period was adopted because it would take three years to build a plant, and one could not expect to sell the complete output of a plant of that size in the first year of production.

In forecasting market demand, ICI took all the hundreds of end uses they could think of and tried to calculate the amount of Terylene likely to be needed for each use. The division was quite happy about the estimates made, but was worried as to whether the company was being bold enough.

Viewers heard how ICI would take advantage of know-how gained in operating the first unit, and that in the new plant both chemical processes and fibre-making processes were being modified. It was hoped to cut production costs.

It was stated that ICI now make nearly 50 varieties of Terylene and that the ultimate market is very much larger than the 50 million lb. a year now being planned for.

Mr. Peter Allen, ICI main board director in charge of fibres, asked if possibilities of nationalisation under a Labour government would affect such a decision, said that such a possibility was always in their minds, but so far had not influenced any of the board's decisions for expansion.

★ THE UK Treasury should take a lead from one of the Commonwealth members and adopt a far more liberal attitude towards the question of University grants. The Australian Government has accepted in principle most of the recommendations of the Murray committee on universities and is to increase its spending of £A6 million over the past three years to £A22 million over the next three.

A permanent universities committee is to be set up and will be headed by Sir Keith Murray, chairman of the UK University Grants Commission. The committee has spent three months investigating Australian universities.

Since the Government does not expect the committee to make recommendations on finance before 1961, it is to give interim emergency aid. Part of this emergency scheme includes paying £A6,270,000 over the next three years towards the capital cost of university building, provided that the States also accept the Murray committee's recommendations.

If the Australian Government can contemplate increasing its expenditure on universities by more than 300 per cent over three years, then Whitehall could surely invest in this country's future on a more generous scale than at present.

Alembic

In Parliament

EMERGENCY USE OF 'KNOW-HOW' FOR DEFENCE PURPOSES

A LIVELY debate on the second reading of the Defence Contracts Bill on 12 December included a Labour member's plea that 'know-how' of processes for manufacture of vital vaccines, such as polio, should be made available to other pharmaceutical manufacturers.

The Bill was introduced by Sir David Eccles, President of the Board of Trade, who said it was concerned primarily with the use in defence contracts of 'know-how'. The Bill revoked regulation 3 of the Defence (Patents, Trade Marks, etc.) Regulations, 1941 under which the Government could authorise the use of 'know-how' in any Government contract.

As a typical case of how the new permanent powers might be used, Sir David instanced the manufacturer who wished to undertake a defence contract and who possessed the 'know-how' essential for carrying it out, but who was embarrassed by the restrictions and obligations included in the commercial terms on which he might use that 'know-how'. The would-be contractor might find that its use was either impossible under his agreement with the owner or was subject to conditions which would be unreasonably onerous on the department placing the contract.

Government's Duty

There must be power to break through restrictions of that kind in the interests of defence. The Government had a duty, however, to see that stringent safeguards were provided. It was accepted that power to authorise the use of 'know-how' should only be given at the highest level in Government departments. The Bill gave no power to compel a manufacturer to disclose 'know-how' to a department or to a third party; all that was sought was the right to authorise a contractor to break his agreement restricting the use of 'know-how' and rely on the Government to compensate the person from whom he had acquired it.

Mr. M. Orbach (Lab., Willesden East) said that last year Ministers were making feeble statements about the lack of poliomyelitis vaccine in the UK because only one firm was making it and because the Crown could not take over the technical processes so that dozens of other firms might make it. The same applied to cortisone and the antibiotics. If the new Bill included the necessary authority, the Minister of Health would have full power to ask that the technical processes of one firm, such as Glaxo Laboratories, should be available to others.

Sir David said he was informed that at present there was no difficulty in getting hold of the 'know-how' about drugs; he understood that the Health Minister felt that the ordinary commercial practices were best. If there was the power, he did not think other countries would make 'know-how' agreements with UK manufacturers because information they had contracted to give to UK firms might under an Act of Parliament be taken away and handed to somebody else.

He concluded by saying that it would not be good to have compulsory powers because in general, 'know-how' was being exchanged very much more between countries.

Ashburton Chemical's Plans for Glynllifon Plant

Discussions are still continuing between Ashburton Chemical Co. Ltd., Manchester, and the local authorities on various technical problems involved in the setting up of a privately-owned plant for the manufacture of bulk chemicals at Glynllifon Park, near Caernarvon. These problems involve, in particular, the water supply and effluent disposal. Mr. F. J. Erroll, Parliamentary Secretary to the Board of Trade, mentioned this in an adjournment debate on industrial development in Caernarvonshire.

Mr. Erroll said the plant would employ some hundreds of workers, mainly men. He added: 'Those discussions, I am sorry to say, are still continuing and, therefore, because of that, no final decision has yet been reached'. There was no doubt that a development of that nature would be very welcome in the area. The Board of Trade had not yet received any application from the firm for an industrial development certificate.

The debate was introduced by Mr. G. Roberts (Lab., Caernarvon) who said the project might well wipe out chronic unemployment and would rejuvenate the ancient town of Caernarvon which now had 700 unemployed.

Responsibility for Methane Liquefaction

Several questions were asked last week on who was the responsible Minister to answer questions dealing with the research in the liquefaction of methane or natural gas. Mr. H. Nicholls, Parliamentary Secretary to the Ministry of Works, told Mr. A. Robens (Lab., Blyth) that the DSIR was not concerned with this work as research in the field came under the Gas Council. Mr. Robens was told to put a question to the Paymaster-General; the matter did not come within the purview of the DSIR for which he is responsible. Mr. Robens wanted to know whether if he put a question to the Paymaster-General, it would be answered and not referred to as a matter of day-to-day administration by the Gas Council.

Publicity for Controlled Thermo-Nuclear Fusion

Promising results had been obtained in the apparatus Zeta at Harwell, but their interpretation would take some time, stated the Prime Minister in the House on 10 December. He had been asked to what extent the Harwell successes in taming the hydrogen bomb for peaceful purposes had been denied publicity by the joint declassification committee; how close was the co-operation on the committee with US scientists; and why a full interim statement could not be made on the progress of the experiments.

Mr. Macmillan said there was full and mutually beneficial collaboration between the UK and the US on all research work in this field. One aspect of the collaboration was the adoption of common rules for the classification of information. The proposals of a joint committee for the declassification of certain categories of information were now being considered. If they were accepted, it would be possible to make public more details about the work now going on in both countries.

Scientific Attaché at Moscow Embassy

Asked when it was proposed to appoint a scientific attaché at the British Embassy in Moscow, Mr. H. Nicholls, Parliamentary Secretary to the Ministry of Works, last week said that such an appointment had been considered from time to time and was now being reconsidered. He recognised the urgency of the problem of extracting scientific information from Russian journals but it was rather premature to give any definite answers at present.

This question was followed by others on the subject of translating Russian scientific literature. Mr. Nicholls did not give the numbers of such translators, but said that a large number were employed part-time on the work and a small number full-time in Government scientific and technical research establishments. In addition, Government departments made use, on a contract basis, of panels of translators outside the Government services.

The Lord President of the Council for whom he was replying was not satisfied that British scientists yet had an adequate picture of scientific developments in Russia. Measures were in hand to improve the availability of English translations, but the aim must be to encourage more scientists to learn to read Russian.

Mr. Nicholls spoke of the difficulty of transferring scientists from carrying out research to translating reports on research. There was a shortage in both cases and it was a matter of using both to the best advantage.

No Power Reactors Yet Exported

Asked to give the value of exports in the last 12 months of nuclear power stations, Sir David Eccles, President of the Board of Trade, last week said that so far no power reactors or associated equipment had been exported.

Uranium from South Africa

During 1957 concentrates equivalent to between 5,000 and 6,000 tons of uranium oxide would have been sold by the South African Atomic Energy Board to the Combined Development Agency operating in the Union and the UK Atomic Energy

Authority, according to their respective needs. This was stated by the Prime Minister in reply to a written Parliamentary question last week. Much the greater part of the AEA's supplies during 1957 would have been secured from South Africa.

Mr. Macmillan did not think it would be in the public interest to say in what proportions the AEA supplies of uranium were allocated between defence and civil use.

Courses in Russian for Science Students

A number of technical colleges which provide evening classes in Russian are planning special courses in Russian for students of science and technology. This was stated in the House last week by Mr. J. Enoch Powell, Financial Secretary to the Treasury.

Expenditure on Nuclear Energy Programme

For the five years up to 31 March 1958, the gross expenditure authorised by Parliament on atomic energy amounted to a total of about £340 million, excluding certain sums 'not disclosed for security reasons.' That total also excludes expenditure on their own account by industry and the universities for which no details are available and expenditure on the civil nuclear power programme which up to 31 March 1958 is expected to be about £25 million.

Cumene-Phenol Plant Planned by British Hydrocarbon

BRITISH Hydrocarbon Chemicals are to build a synthetic phenol plant at Grangemouth which—with the polythene plant now under construction—will bring the company's total investment to over £25 million.

The two plants will cost more than £8 million. Both are to be completed in 1959, with the polythene plant—using the US Phillips low pressure process—coming on stream first.

The phenol plant will use a new process for producing phenol by the conversion of cumene. This process was successfully developed in the UK by the Distillers Company Ltd. who own British Hydrocarbon Chemicals jointly with British Petroleum.

The cumene process produces in addition large quantities of acetone which is also in increasing demand.

Cumene will be made at Grangemouth from benzene and propylene. Greatly increased supplies of propylene are available there following the construction of a second oil cracker early this year under the £8 million expansion scheme, now completed, announced in mid-1955.

Based on the work of the DCL research and development department in its laboratories at Epsom and its pilot-plant establishment at Tonbridge, the process has been licensed to many users abroad. It is used in practically all the major new phenol plants which have been built in recent years, and all expectations of its economy in operation and of the quality of its products have been fully realised. Units have been completed or are under construction in the US, Belgium, Canada, France, Germany and Japan, and further enquiries for licences have been received. (See CHEMICAL AGE, 8 June, p. 966.)

The commercial production of synthetic phenol is based on the indirect oxidation of benzene. All previous processes have involved the use of large amounts of sulphuric acid or of chlorine; as neither of these forms part of the final product, these chemicals either were wasted or involved a further expense in their recovery. In the new process neither is used. Instead, benzene is first made to combine with propylene to form isopropyl benzene (cumene), which is then oxidised to phenol and acetone. The overall conversion is claimed to be very efficient, and the two end-products can be separated relatively easily in a high degree of purity. Large-scale plants using the process can be highly instrumented and embody a considerable degree of automatic control, so that the operating labour force is typically small.

Of the raw materials required, propylene is one of the primary products of cracking petroleum, and increased propylene supply has already been provided at Grangemouth by the recent construction of a second cracking unit. Benzene, a coal-tar product, is already used in large quantities at Grangemouth for the production of styrene monomer and detergent alkylate.

Demands for phenol have expanded greatly in recent years, since it enters into many of the new chemical-based products, including plastics, synthetic fibres, herbicides, insecticides, drugs, dyestuffs and oil additives. Demands are also increasing for acetone, which has been made by DCL for some 30 years by other processes and has wide uses as an industrial solvent and a chemical intermediate.

Textile Institute Conversazione

Third annual conversazione of the Textile Institute held at the College of Science and Technology, Manchester, on 13 December, was attended by 1,001 members and guests. The evening included a series of demonstrations in the departments of textile industries and textile chemistry. Guests were received by Sir Ernest Goodale, president, and Lady Goodale, and Mr. G. Loasby, chairman of the council, and Mrs. Loasby.

Production Index for Chemicals

Industrial production index for chemicals and allied products for August was 169 (1948=100) compared with 183 for July and 164 for August 1956.

Phoryl Resins May Solve Colour-Print Problem

A WAY of overcoming the difficulties of colour-printing polythene, nylon or Terylene has been shown by observations recently made in the Stevenston research department of ICI's Nobel division. It was shown that the dye could be held on polythene by Phoryl resins, phosphorus-containing resins on which the department has worked for several years. The adhesion of these resins to polythene is said to be good.

The dye migrates into the polythene if the dyed resin is printed and left for a few days. The resin can afterwards be removed, leaving the polythene in a coloured state. These 'inks' have been used for some years to mark polythene laboratory containers and are now being used on the plant to stencil polythene equipment.

In colouring nylon and Terylene, the fibres must be heated for a short time to a temperature at which the molecules can move about relatively freely. At such temperatures the dye penetrates from the Phoryl resins and on cooling remains permanently bound against dry-cleaning solvents or laundering. Nitrocellulose and methacrylates can be used as well as Phoryl.

In the laboratory multi-coloured designs have been obtained on these materials by hand painting with lacquers containing 6 per cent of methyl cellulose in a mixture of toluol and alcohol, which also contains Waxoline and Duranol dyes.

The solvents evaporated from those lacquers almost instantaneously and the colour was then fixed by covering with a sheet of blotting paper and pressing with an electric iron at 140°C. Heating for one minute was adequate to give deep colours. The excess lacquer was washed off with acetone at room temperature. The coloured fabric could be washed and dry-cleaned in the usual way without the dye showing any tendency to move.

Bradford Symposium on Chemistry of Plastics

A TWO-DAY symposium on 'The chemistry of plastics' is to be held in conjunction with exhibitions of chemical and physico-chemical apparatus, and of plastics, plastics materials and products, at the Bradford Institute of Technology, Great Horton Road, Bradford 1, on 14 and 15 February. It is being organised by the Bradford Chemical Society in conjunction with the institute's department of chemistry and dyeing, and the Yorkshire Council for Further Education.

The chair at the 14 February sessions will be taken by Dr. W. Cule Davies, chairman, chemistry advisory committee, Yorkshire YCFE; and on 15 February by Dr. E. G. Edwards, principal of the institute.

Papers will be presented as follows: 'Chemistry of plastics and polymers', by Professor C. E. H. Bawn, Liverpool University; 'New polymers and plastics', by Dr. R. R. Smith, BX Plastics Ltd.; 'Applications of plastics', by G. Campbell, ICI plastics division; 'Analysis of plastics', by Dr. J. Haslam, ICI plastics division.

There is no fee for attendance, but intending visitors should contact Dr. W. Moore, of the institute's department of chemistry and dyeing.

ANALYTICAL METHODS IN CLINICAL BIOCHEMISTRY

Summary of Midlands SAC Paper

SOME idea of the problems characteristic of the type of work carried out in hospital biochemical laboratories and some indication of the way they were overcome were given by Mr. H. Varley (Manchester Royal Infirmary) in a paper 'Analytical methods in clinical biochemistry', presented at a recent meeting of the Midlands Section of the Society for Analytical Chemistry in the University of Birmingham.

Several factors were important in determining the kind of technique which clinical biochemists must use. In the first place, substances which had to be determined in biological fluids were, for the most part, present in low concentration. The majority of blood constituents with which one was concerned were present in mg. per 100ml., e.g. glucose 100, and some in only μg. per 100ml., e.g. iron 150. Furthermore, it was now common practice to ask for groups of determinations on the same specimen of blood, e.g. in electrolyte abnormalities, sodium, potassium, chloride, and bicarbonate. In some cases more than one such group might be asked for, so that as many as 10 or 12 determinations had to be made on a single sample of venous blood, 10 to 20ml. in volume, of which only about half might be available since most determinations were made on serum or plasma, not on whole blood. Micromethods, which used between 0.1 and 1.0ml., were therefore the rule. In the case of young infants from whom it was more difficult to obtain blood, ultramicromethods had been developed, and several determinations could then be performed on a few tenths of 1ml. of blood.

Biological Fluids

In the second place, biological fluids were complex, containing a large variety of different substances, both known and unknown. Isolation of a particular substance to be determined was not always possible, so that interference from other substances could be a source of error. To take a simple example, methods for estimating blood glucose, using reduction of an alkaline copper solution, had included amounts of non-glucose reducing substances up to 20-30mg. per 100ml.

Then further, biological fluids were not inert, so that, after taking the specimen, changes could occur as a result of the action of substances present in the fluid, of contact with the atmosphere or of infection, or, in the case of whole blood, of transfer of substances between cells and plasma. Such changes could mostly be prevented by keeping the specimen out of contact with air or sterile, or by separating serum or plasma immediately from the cells, and need not lead to serious error in most determinations.

Finally, the sheer number of determinations now carried out in hospital laboratories had provided an increasing stimulus for development of simplified techniques, so that, for commoner determinations, batches of between 10 and 20, and sometimes between 20 and 30, could be made with the required degree of accuracy in an hour or two. There still remained, of course, more difficult and specialised techniques, the practice and development of which gave full play to the skill of graduate biochemists employed in this work.

Mr. Varley then considered some examples of techniques. Colorimetric methods were now mainly employed. They were particularly suitable because they were very sensitive and could frequently be carried out without rigorous preliminary separation of the particular substance which was being determined. Thus, one very simple colorimetric method was determination in blood serum of bilirubin, the pigment which produced yellow skin colour in jaundice. Bilirubin gave a purplish colour by simply mixing blood serum, a diazo reagent prepared from sulphanilic acid and sodium nitrite, and a further reagent which was required to make all the bilirubin react. The colour was specific, and the method so sensitive that measurable colours could be obtained on 0.4ml. of normal serum at concentrations of less than 1mg. per 100ml. Smaller volumes or diluted serum must be used for severe cases of jaundice, when 20-30mg. per 100ml. might be present. The whole reaction took place in a test tube.

Introduction of the photoelectric colorimeter—or more correctly absorptiometer—had been one of the most important single events in the development of clinical biochemistry. This instrument was simpler to use, and both more sensitive and more flexible than the older visual colorimeter it had completely replaced.

UV Spectrophotometer

Only a few methods, for use in routine laboratories, had been developed so far for which the ultraviolet spectrophotometer was required. An example was the determination in serum of vitamin A, which had an absorption peak at 325mμ. Absorption at this wavelength was measured before and after irradiating a heptane extract of the vitamin from serum with ultraviolet light for three hours to destroy the vitamin A.

The flame photometer was another instrument much used in hospital laboratories today. It had almost completely superseded chemical methods for determining sodium and potassium in body fluids. Development of the flame photometer had come at an opportune time. Batches of these determinations were now done daily, quickly and reliably, in a matter of minutes. Attempts to determine calcium by means of the flame photometer had not yet been fully successful.

In ordinary routine work, paper chromatography had been mostly used for separating sugars and amino acids. Its application to the former presented few difficulties. Straight ascending or descending chromatography, using butanol—acetic acid—water, phenol, or cresol, with suitable stains, such as benzidine, ammoniacal silver nitrate, aniline hydrogen oxalate, had afforded a valuable means of showing the presence of sugars, such as lactose, which occurred in the urine of some lactating women.

Separation of amino acids was not nearly so easy. A large number of amino acids and related compounds could be found in urine, so that, for satisfactory separation, two dimensional chromatography was necessary. Considerable experience was required if reliable results were to be obtained. Given this, the technique gave useful information in a number of diseases in which there was abnormal amino acid excretion.

Paper Chromatography

Paper chromatography had been used to separate steroids, porphyrins and α-ketoacids, though not as yet, to any great extent in ordinary routine laboratories. Chromatographic separation by absorption on to alumina had also found some applications.

Paper electrophoresis, at least of serum and plasma proteins, was now a normal routine procedure in most laboratories. As commonly carried out, separation of protein into five components occurred. Movement was almost wholly to the positive electrode. Fastest moving was the albumin, the other four being globulin fractions, which had been termed α_1, α_2, β and γ-globulins in order of decreasing speed of movement, the γ-fraction usually being found in the vicinity of the start line. These globulin fractions, although themselves composite—further subdivision was possible by using different buffers—did have some physiological significance.

Several firms produced scanners, which were essentially photoelectric colorimeters. However, because there were several sources of error, careful standardisation was necessary to make electrophoresis quantitative.

Mr. Varley concluded with a brief survey of recent work on the assay of some steroids in urine. The first satisfactory chemical method for any group of urinary steroids was the application, by Callow, of the Zimmermann reaction to assay of 17-ketosteroids. These compounds, containing an activated methylene group $-CH_2-CO-$, gave a purplish colour with m-dinitrobenzene in presence of alkali. Preliminary acid hydrolysis of conjugates was necessary, followed by extraction into organic solvents. Inter-

fering chromogens were still present and added to the colour, but the Zimmermann reaction, as carried out on these extracts, had been thoroughly studied so that, by reading at different wavelengths and applying correction formulae, the effect of the chromogens could be allowed for and a reliable assay of the steroids obtained. The method was highly sensitive, and 50μg. was used for final colour development.

All active compounds of the cortisone group had hydroxyl at carbon-21, and a Δ^4-3-ketone ring. Some had hydroxyl or carbonyl at caroon-11, and hydroxyl at carbon-17. These substances were excreted in urine, unchanged to a small extent, but mostly as inactive metabolites in normal people. Sometimes, in disease, increased amounts of these metabolites were excreted; in other cases, synthesis might be impaired, so that large amounts of precursors, most characteristically without a hydroxyl at carbon-21, could then be found in urine. Therefore, it might be useful, not only to know the total amount, but also the type of steroid present in urine.

Steroid Determination

Earlier methods for determination of these substances did not prove very satisfactory, in part at least, because acid hydrolysis, used to free the steroids from the conjugated form in which they were excreted, caused considerable destruction of the steroids themselves. In 1952, however, Norymberski and his co-workers showed that several of these groups of corticosteroids could be oxidised by sodium bismuthate, a glycol-splitting reagent, to 17-ketosteroids and that, for this, preliminary hydrolysis was not required since the conjugates were also oxidised. Having been converted into 17-ketosteroids, they could be determined by the Zimmermann reaction. So 17-ketosteroids were determined before and after oxidation with bismuthate and the difference gave 17-ketosteroids formed from corticosteroids. Steroids which could be oxidised in this way had been termed 17-ketogenic steroids.

Norymberski and his co-workers had introduced further methods for studying these compounds. By treating urine with sodium borohydride, a group of 17α-hydroxycorticosteroids, not oxidisable by bismuthate, were made so by reduction of their 20-ketone group to the secondary alcohol.

The 17-ketone of the 17-ketosteroids already present in urine was similarly reduced, but to compounds unaffected by bismuthate and not giving the Zimmermann reaction. As a result, if the Zimmermann reaction was carried out on extracts obtained after borohydride reduction followed by bismuthate oxidation, the 17-ketosteroids thus determined gave a measure of the total 17α-hydroxycorticosteroids. In the normal urine there was little difference between total 17α-hydroxycorticosteroids and 17-ketogenic steroids. However, the former could be produced and excreted in increasing quantities when synthesis of active hormones was impaired, as it was in some disorders of the adrenal cortex. Then there might be a considerable difference between total 17α-hydroxycorticosteroids and 17-ketogenic steroids.

Norymberski had also shown that compounds belonging to the group which included cortisone, lost the 17α-hydroxyl group when treated with zinc and acetic acid and then were no longer oxidised by bismuthate. It thus became possible to determine the amount of these present from the difference between the 17-ketosteroids determined after bismuthate oxidation and those present after treatment with zinc and acetic acid followed by bismuthate oxidation. This group represented active hormones and their metabolites, increased quantities of which were excreted in conditions with increased hormone production by the adrenal cortex or by tumours of the cortex.

One method of assay, the Zimmermann reaction, was common to these various procedures. The preliminary steps could be carried out in centrifuge tubes, for the amount of urine required was small. The procedures were therefore satisfactory for ordinary routine laboratories, and they provided, rather more simply, the sort of information which paper chromatography could give.

LANCASHIRE ANALYST'S RECORD YEAR FOR SAMPLE TESTING

TOTAL number of samples from all sources examined during the year was the highest for the laboratory and was more than double the number examined annually in any year prior to 1947, states the 1956 annual report of the county analyst Dr. G. H. Walker of the Lancashire County Council.

The number of samples examined for the county under the Food and Drugs Act and the Fertilisers and Feeding Stuffs Act (excluding, however, milk samples submitted for phosphatese, methylene blue or turbidity tests) was 8,293 and the number of food and drugs samples submitted by the ten autonomous food and drugs authorities was 2,183.

It is reported that of the 48 samples of flour, eight county samples were reported upon adversely; three were deficient in creta praeparata; three were deficient in creta praeparata and iron; one was deficient in creta praeparata, iron and vitamin B_1 and one contained excess calcium carbonate. The deficiencies found in five of the samples were only slight and no action was advised. With regard to the three remaining samples: No. N.4974 contained only 7 oz. of creta praeparata per 280 lb., and only 1.05 mg. of iron and 0.15 mg. of vitamin B_1 per 100 g., No. E.7305 contained only 1.7 oz. of creta praeparata per 280 lb., and only 0.8 mg. of iron per 100 g. while No. E.8266 was found to contain as much as 820 mg. of calcium carbonate per 100 g. of flour (the maximum quantity permitted by the flour (composition) regulations being 390 mg. per 100 g. of flour).

The first two of these three unsatisfactory samples were submitted for examination before the date upon which the flour (composition) regulations, 1956, came into operation, and the results of the examinations of samples Nos. N.4974 and E.7305 were, therefore, brought to the notice of the Ministry of Agriculture, Fisheries and Food. The manufacturers of sample E.8266 were communicated with direct and they gave an assurance that they would, in future, do everything possible to avoid a recurrence of an excess of calcium carbonate by trying to secure a more even distribution of creta praeparata in their product.

Of samples containing extraneous matter, E.7969, which consisted of a part bottle of lemonade, was submitted as the result of a complaint that it had an unpleasant odour. Upon analysis it was found to contain a faint trace of sulphuretted hydrogen (0.09 p.p.m.). The general appearance of the label on the sample suggested that it was old stock and the presence of sulphuretted hydrogen was almost certainly due to the action of the citric acid in the sample on the vulcanised composition stopper of the bottle. The manufacturers were cautioned.

During the year, County sampling officers submitted for examination 12 samples of compound codeine tablets, two samples of aspirin tablets for children and one sample of buffered aspirin tablets. In addition, two samples of ordinary aspirin tablets BP were submitted by autonomous food and drugs authorities. With the exception of one sample of compound codeine tablets and one sample of children's aspirin tablets all the samples were reported to be satisfactory. An informal sample of compound codeine tablets, No. N.6391, was found to comply with the requirements of the British Pharmacopoeia as to the composition but it failed to pass the new disintegration test in that, although the greater part of the tablets disintegrated rapidly, a number of fairly large particles were left which did not pass through the wire gauze disc in the prescribed time of 15 minutes.

The manufacturers were communicated with and it appeared from the correspondence that they might still be using the disintegration test of the 1953 BP which does not require the use of a wire gauze; under this less stringent test the tablets would appear to disintegrate rapidly and the presence of some relatively large particles might not be noticed. It was suggested by the manufacturers that the trouble was due to the use of a coarser sieve than normal for the granulation.

With regard to the remaining unsatisfactory sample of aspirin tablets for children, No. C.5574, this consisted of soluble aspirin tablets each containing 1¼ grain of acetylsalicylic acid together with calcium carbonate and citric acid. While the amount of aspirin present was correct, the tablets contained a very high proportion of free salicylic acid, corresponding to 1.8 per cent., of the aspirin content or approximately 11 times the BP permitted limit for salicylic acid in soluble aspirin tablets. Both the retailer and the manufacturer were communicated with and the stock, which was of old manufacture, was withdrawn from sale.

AUSTRIA'S CHEMICAL OUTPUT RISES AT SLOWER RATE

THE value of Austria's chemical industry production rose to A. Sch. 6.8 milliard in 1956. This figure represents an increase of the order of 10 per cent compared with the previous year. The rate of increase is slowing down, however; in 1955 Austrian chemical production increased by 18 per cent. The chemical industry has maintained third place in the Austrian economy.

The industry employs 39,400 people of which 30,000 are unskilled workers and 9,400 trained personnel. The total has been increased by 3.8 per cent. The main sectors utilising the work force are:

Chemical and fertiliser products	28%
Asbestos (Amianthus)	21%
Synthetic fibres	9%
Pharmaceutical industry	8%
Plastics	7%
Soap	5%
Paints and varnishes	4%

In volume, chemical production in 1955 and 1956 was composed as follows:

Section	Unit	1955	1956
Organic and inorganic products	Tons	336,149	369,963
Fertilisers	,,	634,904	662,273
Acetylene	,,	2,837	2,884
Compressed gases	m³	8,639	8,997
Carbon dioxide	Tons	2,612	2,822
Fibres	,,	39,549	42,507
Asbestos (Amianthus)	,,	31,460	29,134
Plastics materials	,,	9,880	10,909
Paints, varnishes and colours	,,	35,257	35,713
Soaps, etc.	,,	53,566	55,047
Pharmaceutical products	mill. Sch.	317.6	344.3

Among the new manufacturing enterprises in 1956 were activated charcoal, sodium phosphate, sodium metal, sodium pyrophosphate, sodium thiosulphate, sodium triphosphate, polyester resins, pesticides and various plastics materials and allied products.

Overseas Trade

Imports and exports of chemical products gained considerably in importance in 1956.

	Tons	% 1956/1955	mill. schil.	% 1956/1955
Exports	530,425	+21.8	15,715	+23.6
Imports	685,612		32,070	+15.1

In 1956, exports increased (+ 23.6 per cent) compared with imports (+ 15 per cent) in contrast with 1955 when imports were greater in proportion to exports (24.2 per cent against 6 per cent).

Electrolytic installations for chlorine and alkalis have increased production of these chemical basic materials and now not only cover home needs, but leave an exportable surplus. Sodium silicate production has increased (+ 20 per cent) as also sodium sulphate and sodium perborate (+ 3 per cent).

Production of sulphuric acid increased by 7 per cent in 1956, so permitting a reduction of 14,400 tons in imports. Production of hydrochloric and nitric acid now covers domestic requirements. Acetic acid requirements, however, have increased necessitating a 50 per cent increase in imports.

Zinc sulphate production capacity has been utilised satisfactorily and sales of carbon disulphide have been considered.

Production of phosphates has been augmented by the manufacture of sodium diphosphate, of pyrophosphate and triphosphate.

Production of carbide has fallen by 7 per cent.

In the other sections, sales of nitrogen have increased by 6.8 per cent, of carbon dioxide by 8 per cent, of phthalic anhydride by 15 per cent, and of plasticisers by 21 per cent.

In contrast, the situation has remained unchanged for hydrogen peroxide, and for acetylene but production has decreased by 4.6 per cent for liquid oxygen and by 13 per cent for hydrogen.

Sales of nitrogen fertilisers, slow to rise, have reached 577,000 tons of which 429,000 tons have been exported. Austrian exports have thus increased by a quarter in 1956, in spite of strong world competition. Exports have been mainly to Europe 52.5 per cent, to Asia 33.1 per cent, and to Africa 13.1 per cent. Exports to Asia tripled in 1956 by the opening of the China market. Production of phosphate fertilisers has increased to 43,000 tons of which almost the whole has been taken up in the home market.

Despite increased external competition, pharmaceutical products have attained a value of A. Sch. 338.35 million, an increase of more than 6.4 per cent compared with the preceding year. Imports realised 2.2 per cent of the total, A. Sch. 176.16 million, while exports have increased by 52.6 per cent up to a total of A. Sch. 27.41 million. Basic plastics materials have increased by 10 per cent although present foreign competition exerts considerable pressure.

Japan's 15 Per Cent Increase in Chemical Production

JAPAN'S chemical industry during the first half of this year has increased by 15 per cent compared with the same period in 1956.

The increased capacity in the heavy chemical section for electrolytic chlorine-alkali production has increased the output of chlorine by 28.6 per cent and of caustic soda by 22.2 per cent.

There has been a change-over in production from calcium cyanamide and ammonium nitrate to ammonium chloride and urea.

Expansion of methanol production has been rapid and given rise to increased output of formaldehyde. Petrochemical growth has been steady as seen by phenol and benzol production. There has been a notable increase in polyvinylchloride production. Under Japan's five-year plan production for 1957 was put at 60,000 tons. In the first half of this year 51,000 tons of p.v.c. has already been produced.

The statistics shown below have been issued by the Japanese Ministry of Economics.

(in 1,000 tons)

Inorganic heavy chemicals	1956	1956 1st half of year	1957 1st half of year	% difference
Chlorine-liquid	93.2	42.6	54.8	+ 28.6
Hydrochloric acid (35%)	257.4	128.9	138.1	+ 7.2
Sulphuric acid (100%)	3 694.9	1 792.5	1 966.4	+ 9.7
Nitric acid (98%)	96.1	46.5	45.3	— 2.6
Caustic soda	645.3	298.2	364.4	+ 22.2
Sodium carbonate	379.4	185.5	202.6	+ 8.9
Ammonia	879.6	430.3	478.7	+ 11.2
Calcium carbide	756.0	408.3	368.7	— 9.7
Sodium bicarbonate	10.4	5.5	5.8	+ 5.5
Glauber's salt (cryst.)	634.6	287.6	362.6	+ 26.1
Sodium sulphide	27.7	13.1	15.7	+ 19.9
Chloride of lime	31.7	17.3	12.6	— 27.2
Zinc oxide	19.6	8.7	12.4	+ 42.5
Carbon disulphide	137.4	62.3	74.2	+ 18.9
Carbon black	11.2	4.6	7.3	+ 58.7
Fertilisers				
Calcium cyanamide	507.9	276.0	204.4	— 25.9
Ammonium sulphate	2 322.6	1 150.9	1 174.5	+ 2.1
Ammonium nitrate	46.3	21.2	22.6	+ 6.6
thereof as fertiliser	26.0	12.3	11.2	— 8.8
Ammonium chloride	76.4	38.8	63.6	+ 63.9
thereof as fertiliser	69.5	35.3	60.6	+ 71.7
Urea	262.2	127.3	175.9	+ 38.2
thereof as fertiliser	242.6	117.9	166.7	+ 41.4
Calcium superphosphate	2 058.0	1 071.6	1 090.9	+ 1.8
Phosphate slag	360.4	220.4	194.9	— 11.6
Mixed phosphate fertiliser	1 203.3	615.7	716.8	+ 17.4
Organic chemicals				
Coal tar	611.0	308.5	332.0	+ 7.6
Benzol (ref.)	56.6	26.5	31.4	+ 18.5
Toluene (ref.)	9.5	4.7	5.2	+ 10.6
Phenol	23.1	10.3	14.2	+ 37.9
Aniline	5.7	2.9	3.1	+ 6.9
Methanol	85.7	39.3	52.6	+ 33.8
Ethanol (95%)	27.8	11.8	12.0	+ 1.7
Formaldehyde	84.3	38.2	57.0	+ 33.5
Acetic acid (synthetic)	38.0	18.0	21.4	+ 18.9
Dyestuffs (synthetic)	22.0	10.6	11.6	+ 9.4
Synthetics				
Celluloid	7.8	3.8	4.3	+ 13.2
Phenol resin	16.6	7.3	10.4	+ 42.5
Urea resin	55.6	24.6	32.7	+ 32.9
P.v.c.	55.9	23.0	51.1	+ 122.2
P.v. alcohol	11.8	5.2	7.8	+ 50.0
Other chemical products				
Soaps	296.6	142.5	162.9	+ 14.3
Paints and varnishes	187.1	84.4	99.8	+ 18.2
Printing inks	29.7	13.8	15.5	+ 12.3
Explosives	32.5	15.5	18.2	+ 17.4

EDUCATION MINISTER OPENS NEW ICI APPRENTICE SCHOOL

Sir Edward Boyle, [left], unveils the commemorative plaque. Behind Sir Edward are Mr. J. A. L. Young, Billingham division personnel director and Mr. W. J. V. Ward, Billingham division chairman

OPENING the new engineering apprentice school at Imperial Chemical Industries' Billingham factory on 6 December, Sir Edward Boyle, Parliamentary Secretary to the Ministry of Education, said that there had been great expansion in technical education. Since the war 443 building projects had been completed at a cost of £34 million. There were now over four million part-time students.

Billingham chairman, Mr. W. J. V. Ward, said that the school had been in use since July, 1956. He added that 472 of the apprentices employed by the division were attending classes.

The building is modern in style with light, spacious rooms, bright colourings and contemporary furniture. Facilities are provided for the training of apprentices in 15 trades.

Expanding Chemical Interests of Dorman Long Group

EXPANSION of the Dorman Long group's chemical interests is given pride of place in a new colour brochure 'Dorman Long, 1957.' The Clarence Works of Dorman Long (Chemical) Ltd. are now refining crude tar and crude benzole resulting from the carbonisation at DL iron and steelworks of 2.4 million tons of coal a year. In addition intermediate benzoles and crude tars are received from other sources.

Operations at Clarence are on a substantial scale, annual outputs include pure benzole 4 million gallons, pure toluole 800,000 gallons, pure xylenes 300,000 gallons, naphthalene 9,000 tons, anthracene 1,000 tons, thermoplastic resins 3,000 tons. The product range also includes road tars, refined tars, coal tar fuels, creosotes, anthracene oils, pitch, etc.

A modern Dorman Long grinding plant has recently been installed at Lackenby with an initial output of 1,500 tons a week of ground basic slag. The ground slag is blown by compressed air either to one of four silos or direct to an automatic 12-spout packing machine which fills and weighs valved self-sealing 1 cwt. paper sacks at the rate of 60 tons an hour. The filled sacks are conveyed mechanically to loading points for road or rail distribution. Practically all the remaining steel slag output is charged back into the blast furnaces replacing limestone. The group's steel furnaces produce about 350,000 tons of basic slag a year.

The brochure illustrates engineering projects in hand by the Tees Side Bridge and Engineering works, which on nuclear power projects is associated with the General Electric-Simon-Carves group. It is undertaking the supply and erection of the steelwork for the turbine hall, reactor buildings and heat exchanger buildings at the Hunterston, Ayrshire, power station. The company is supplying and erecting more than 3,000 tons of steelwork for the Atomic Energy Authority's main process buildings and office block for the new Springfields uranium plant in Lancashire.

San-Mex Celebrate 25th Anniversary

A RECEPTION and dance was held in Marlborough House, Glasgow, on 5 December by British Products San-Mex Co. Ltd., to mark the 25th anniversary of the founding of the firm. The guests were received by Mr. and Mrs. L. Groden. More than 200 guests were present. Mr. Groden, founder and managing director said the company started in 1932 in a single room laboratory in Eglinton Street, Glasgow. A move was then made to St. Andrew's Square, Glasgow, and after a disastrous fire, to the present premises in Dalmarnock Road, Glasgow.

In the early years, the products were soaps and disinfectants sold in bulk to industrial users. During the war several Government contracts were secured. Since 1955 pharmaceutical products have formed a major part of the company's range.

Radiochemical Laboratories

Architects for the new extensions to the Radiochemical Centre, Amersham, were J. Douglass Matthews and Partners, 3 Ebury Street, London SW1. G. H. Buckle and Partners acted as the consulting engineers. The extensions were reported in CHEMICAL AGE, 9 November, page 760.

FSC Revise Fluorine Content of Foods

REVISED recommendations for limits for fluorine content of foods have recently been published by the Food Standards Committee. ('Food Standards Committee report on Fluorine: Revised recommendations for limits of fluorine in food'. FSC/MC/Rep. 15.) A point which arose for consideration by the committee was whether the limits of fluorine in acid phosphates and related foods laid down in the Fluorine in Food Order, 1954, called for revision.

The committee have been informed that the manufacture of acid calcium phosphate from rock phosphate is no longer a necessary part of the supply for food. It is suggested therefore that with reasonable precautions the fluorine content of acid calcium phosphate produced from elemental phosphorus can be kept within a limit of 30 p.p.m. This figure is already enforced in the Canadian Food and Drug Regulations and the committee recommend that it should be adopted in the UK.

As a result, some modification of the committee's original proposal to apply a limit of 10 p.p.m. fluorine to baking powder is called for; a limit of 15 p.p.m. fluorine is therefore recommended for baking powder, including golden raising powder. For self-raising flour a limit of 3 p.p.m. fluorine is recommended.

November Price Index for Chemicals

PROVISIONAL price index for chemical and allied products in November is 144.3, the same as the October figure (June 30 1949 = 100). The figure for November 1956 was 141.3. A breakdown of these figures is as follows:

	Nov. 1957	Oct. 1957	Nov. 1956
Dyes and dyestuffs	143.2	143.2	143.3
Disinfectants	126.5	126.5	126.5
Insecticides, weedkillers and fungicides	128.0	126.9	135.5
Synthetic resins and plastics materials	121.2	121.2	123.5
General chemicals	164.2	164.2	157.5
Benzole, pure BSS	191.4	191.4	182.9
Caustic soda liquor 100° Tw. ...	168.6	168.6	157.6
Soda ash, light (d/d)	174.5	174.5	164.5
Soda ash, light, f.o.r. works ...	185.7	185.7	173.4
Sulphuric acid, BOV	177.2	177.2	173.7
Sulphuric acid, ROV 94/95 per cent	190.8	190.8	181.8
Synthetic detergents	121.1	121.1	115.4

Forth Chemicals Cut Styrene Price

A FURTHER reduction of £5 per ton in the selling price of their monomeric styrene, effective 1 December, is announced by Forth Chemicals Ltd. Monomeric styrene is used for the manufacture of polystyrene, an important plastics material, and in the manufacture of synthetic rubbers, styrene-butadiene copolymers, ion-exchange resins, polyester resins, etc.

The increased scale of production at Forth's greatly expanded plant at Grangemouth has reflected economies in costs of production which are being passed on to the consumer.

Forth Chemicals are owned two-thirds by British Hydrocarbon Chemicals Ltd., and one-third by Monsanto Chemicals Ltd. British Hydrocarbon Chemicals are jointly owned by British Petroleum Co. Ltd. and the Distillers Co. Ltd.

INDIA'S FERTILISER EXPANSION PROGRAMME

French Contractor for Nangal Scheme

CONSIDERABLE expansion is taking place in India's fertiliser industry. Substantial progress has been made in the Sindri Fertiliser and Chemicals Co.'s Rs.110 million (£8,250,000) expansion scheme (CHEMICAL AGE, 18 May 1957). The construction of buildings and installation of equipment by the Italian firms Montecatini and Ansaldo continued to progress throughout the year.

During the year ended March 1957, the Sindri Company, a Government undertaking, made a gross profit of Rs.40,959,873 (£3,072,741) showing an increase of Rs.3,442,095 (£258,156) over the preceding year. A dividend of Rs.8.5 million at 5 per cent on the invested capital of Rs.170 million has been declared as against Rs.6.8 million during the previous year.

Production of ammonium sulphate was 333,705 tons as against 326,062 tons in the preceding year.

An order for the supply, erection and commissioning of the fertiliser group of plants for Nangal Fertilisers and Chemicals' project has been placed with a French firm, Saint Gobain of Paris, on a turn-key basis. Half of the fertiliser plants are due to be erected and put into commission by December 1959, and the remaining half by March 1960. The production capacity of the plants will be 395,136 tons of nitro-limestone fertiliser a year.

Fertiliser Plants

The fertiliser group of plants will consist of an air liquefaction plant, an ammonia plant, a nitric acid plant and a nitro-limestone plant with the necessary bagging and storage facilities.

Manufacture of Phenylacetic Acid—The Regional Research Laboratory, Hyderabad, has carried out extensive trials on the production of phenylacetic acid and phenylacetamide. Data have been compiled for a plant producing 2 tons per day of phenylacetic acid. Cost of production, starting from toluene, comes to Rs.2.50 (3s 8d) per lb.; the market price of the product is Rs.3.67 (5s 6d) per lb.

At present the main consumers of phenylacetic acid and phenylacetamide are the Hindustan Antibiotics (Private) Ltd., Pimpri, whose annual requirements of the acid and the amide are 115,590 lb. and 72,180 lb. respectively, valued at nearly a million rupees (£750,000).

Demand for penicillin during the Second Five-Year Plan period is estimated at 40 million mega units per year, which is nearly four times the present production. The demand for phenylacetic acid and phenylacetamide would therefore increase correspondingly.

Ammonium Carbonate as Intermediate—Possibilities of using ammonium carbonate, produced by the interaction of calcium carbonate and ammonium chloride solution at elevated temperature, for producing soda ash, are being investigated at the Jadavpur University, Calcutta, under a research scheme financed by the Council of Scientific and Industrial Research.

Charges of ammonium chloride and calcium carbonate in the ratios 1.25:1, 1.5:1 and 1.86:1 were heated in an autoclave at pressures ranging from 40 to 100 lb./sq. in. The yield of ammonium carbonate increases with increase of pressure and the ratio of ammonium chloride to calcium carbonate. A tower reactor is being designed for carrying out the reaction at higher pressures.

INDIAN NEWSLETTER

- **Progress in India's fertiliser projects**
- **Investigations on use of ammonium carbonate for soda ash production**
- **Fluidised bed technique for production of maleic anhydride from benzene**
- **Pilot plant projects for rayon pulp production**
- **Indian research on carbon blacks**
- **Continuation of protection of India's titanium dioxide industry**

Maleic Anhydride from Benzene—Investigations on the production of maleic anhydride by the catalytic oxidation of benzene, using the fluidised bed technique have been in progress at the Shri Ram Institute for Industrial Research, Delhi. Maleic anhydride is one of the primary chemical intermediates required for the plastics and paint industry. It is not manufactured in India at present.

Investigations have led to the following conclusions: (1) Maleic acid in 90 per cent yield is obtained using a catalyst composition consisting of equal parts of vanadium and molybdenum oxides modified with lithium, sodium and phosphorus salts; (2) when impregnated on alundum carrier the catalyst does not lose its activity either on continuous running or after prolonged use. Also, it permits feeding of higher quantities of benzene per unit volume of the catalyst and the ratio of air to benzene can be brought down to 66.5:1 (by volume) without affecting the yield; and (3) stainless steel is recommended as constructional material for the plant; mild steel is unsuitable.

Pilot Plant Projects—The governing body of the Council of Scientific and Industrial Research has sanctioned the establishment of pilot plant projects for the production of rayon pulp from indigenous raw materials and a viscose spinning unit at the National Chemical Laboratory, Poona. India's requirements of rayon pulp and viscose yarn are now met entirely by imports. The country's resources of coniferous timber being already slender, the fast-growing hardwoods of eucalyptus, bamboo and wattle deserve consideration as alternate raw materials for dissolving pulp. Preliminary consultations were held by the National Industrial Development Corporation with leading foreign manufacturers in this line and arrangements have been made to ship Indian bamboo, eucalyptus and wattle to Sniaviscosa, Milan (Italy), to carry out tests in their plants and report on the possibilities of using these raw materials for rayon grade pulp manufacture.

The governing body has also decided to establish a Central Indian Medicinal Plants Organisation for the development of medicinal plant industry in the country. The organisation will co-ordinate the activities connected with the development of medicinal plant resources of the country and advise on the future development of the industry.

Carbon Blacks—Work at the National Chemical Laboratory on the production of reinforcing grades of carbon blacks has shown that employing the furnace combustion process, a plant can be operated in India to produce from different feedstocks carbon blacks of different degrees of fineness and characteristics (CHEMICAL AGE, 1957, 77, 838).

The blacks produced in the laboratory compared with the best commercial furnace blacks and were of SRF, HAF and intermediary grades. They had less than 1 per cent moisture, gave colourless extracts with toluene, had 0.4 per cent or less toluene extractable matter, and less than 2 per cent volatile matter. However, the grit content was high due to the presence of flakes of rust gathered by the carbon black in transit through the cyclones and the bag filter unit; the grit content could be brought down to about 0.1 per cent by the removal of rust. The blacks so derusted had less than 0.75 per cent ash.

Furnace Blacks

It is concluded that most of the furnace blacks consumed by the Indian rubber industry—SRF, HMF, FEF, GPF, and HAF—can be manufactured from petroleum oils available in India, or from their blends with indigenous tar oils; these blacks compare well with the blacks marketed by leading manufacturers abroad.

According to the cost estimates based on the figures available for the NCL plant, the ex-works price of carbon black would be between Rs.3 2 and 4 4 per lb. (6s 8d) depending on the type of black.

Copper Enamels—The Central Glass and Ceramic Research Institute, Calcutta, has developed an enamel composition for use on copper without the use of toxic materials (lead and arseneous oxides) which are commonly employed in the manufacture of such compositions. The manufacturing process is simple, comparatively rapid and yields compositions comparable in performance with the imported product. India imports enamelled copper articles valued at Rs.300,000 every year.

Detection of Adulteration in Butter Fat—A method for detecting adulteration of butter fat with hydrogenated oil has been developed by the Central Food Techno-

logical Research Institute, Mysore. The method is based on the determination of turbidity temperatures of the adulterated sample in a solvent system. The temperature depends on the solubility of individual fats or their mixtures in the solvent. The turbidity temperature of butter fat in benzyl alcohol-glycerine solvent system has been found to be 20° to 25° C lower than that of hydrogenated fat and thus affords a ready means of detecting adulteration.

Electrolytic Manganese from Low Grade Ores—A process for the production of electrolytic manganese (99.95 per cent purity) from low grade manganese ores containing 20-30 per cent manganese has been developed at the National Metallurgical Laboratory, Jamshedpur. The process (India Pat. No. 49355) consists in dissolving the ore in waste liquor from electrolytic cells and electrolysing the resulting liquor after purification. The ore is either given a reducing roast or mixed with sawdust before addition to waste liquor. A pilot plant (capacity 30-32 lb. of metal per day) designed and fabricated at the laboratory is being used for further investigations.

The cost of production of electrolytic manganese by the above process is estimated at Rs.1,200 (£90) per ton or less.

Titanium Dioxide Industry—The Government have accepted the Tariff Commission's main recommendation that protection to industry should be continued for a period of four years, i.e. till 31 December 1961, at the existing rate of protective duty, namely, 35 per cent *ad valorem* (preferential) and 45 per cent *ad valorem* (standard).

Continuance of protection to the industry is, according to the Commission, warranted by the projected expansion schemes of the Travancore Titanium Products, the only firm manufacturing pigments in the country.

In view of the increasing demand which is expected to rise to 3,600 tons for anatase pigment from the present level of 2,600 tons and to 1,200 tons for rutile pigment from 400 tons, plans are afoot to bring the production potential to the self-sufficiency level. When the schemes materialise, the productive capacity for anatase pigment will rise to 2,600 tons in 1959 and further the production of rutile pigments would also be started. These schemes will involve an outlay of Rs.7.3 millions.

Sharples Introduce Three High-Speed Centrifuges at New York Show

THREE new high-speed centrifuges were introduced by Sharples Centrifuges Ltd., Tower Works, Doman Road, Camberley, at the 26th Exposition of Chemical Industries held in New York from 2 to 6 December. These have been developed to meet the need for centrifugal equipment to operate at greatly increased pressures and temperatures. The company also showed an operating display of dry powder process engineering, featuring their new pilot size classifier, the K-8.

The new Sharples centrifuges introduced at the show were:

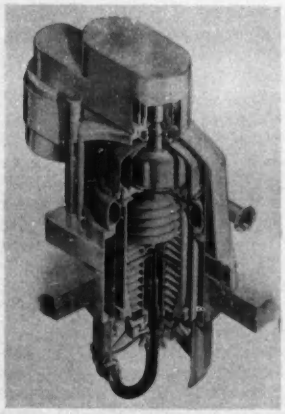
High capacity vertical decanter-type centrifuge for pressure operation for handling slurry feeds in the range of 200 to 250 gall./minute with solids discharge of up to 10 tons an hour. Called the Sharples P-7000 Super-D-Canter, it includes a pressure-tight model for operation at up to 150 p.s.i., a vapour-tight model for operation at up to 15 p.s.i. and an open model. Unique design features incorporated in the P-7000 are a single set of seals (which are not in contact with the slurry); only one set of main bearings required; and integral mounting of motor on the frame.

A new high capacity nozzle-type continuous centrifuge is also available for operation under pressures up to 50 p.s.i. and more. Employing a double-row nozzle system and a 30 in. diameter bowl, the DH-6 Nozljector provides for clarifying, separating, or solids concentration at rates up to 300 gall. per minute or more. The new bowl design and high efficiency drive permit full utilisation of up to 125 h.p. The DH-6 is available in pressure-tight, vapour-tight or open designs, and with or without a recycle system for the controlled concentration of solids.

The high speed horizontal decanter-type centrifuge, due to its high speed of rotation (4,000 r.p.m.) and longer bowl, offers materially increased throughput capacity and greatly improved clarity in the continuous processing of slurries. Called the P-3000 Super-D-Canter, this unit is designed to handle economically large quantities of slurries and suspensions in the removal, recovery and dewatering of solids from slurries and the clarification of liquids.

Two other UK exhibitors at this exhibition were QVF Ltd., Stoke-on-Trent, and Manesty Machines Ltd., Liverpool. QVF displayed a selection of glass heat exchangers in diameters of 6, 9 and 12 in.; a complete all-glass vacuum fractionation vessel fitted with a steam-heated boiler unit of 15 sq. ft.; 6 in. diameter fractionation column; and a 15 sq. ft. 6 in. diameter condenser.

The Fitzpatco Corporation, agents for Manesty, showed the DryCota combined tablet making and compression coating machine and the Manesty coating pan with variable speed drive and self-contained hot air blower. Mr. S. Butterworth, technical representative, demonstrated the manufacture of dry coated tablets by the Manesty method.



Sharples P-7000 Super-D-Canter

BP Order Linear Accelerator for Research

A 4-MILLION electron-volt linear accelerator has been ordered by British Petroleum Ltd. for their research station at Sunbury-on-Thames, Middlesex.

It is believed to be the first machine of its kind in the country to be built specifically for industrial research in the petroleum and chemical industries. Design and construction of the accelerator and its associated control equipment are being undertaken by Mullard Research Laboratories on behalf of Philips Electrical Ltd., the contractors.

It provides a compact, easily-controlled source of high-energy electrons, deep-penetration X-rays or neutrons, the last two being produced by causing the electron beam to hit a suitable target. The machine is of the travelling-wave type, using radio frequency power generated by a magnetron valve operating at a frequency of 3,000 Mc/s. Mean electron energy is 4.0 MeV, and mean electron output 800 watts at 500 pulses per second. Pulse repetition frequency is variable between 100 and 500 pulses per second. Maximum X-ray output using a tungsten target is 700 roentgens per minute at one metre distance from the target.

A special building embodying adequate protection for the staff against radiation is being constructed to house the unit. The compact dimensions of the trolley mounted machine—it measures only 6 ft. long, 2 ft. 3 in. wide and 6 ft. 3 in. high—and the ease with which it can be installed have simplified the requirements of the building considerably.

Apart from its use as a research tool, the linear accelerator is also of application in chemical processing, industrial radiography and in the medical sphere for the deep X-ray treatment of tumours.

In chemical processing, for example, electron irradiation is recognised as an efficient method of initiating polymerisation and other chemical reactions, and of producing new materials by molecular rearrangement or graft techniques. For non-destructive inspection, the linear accelerator makes possible the examination of steel many inches thick by the radiographic method.

Extension of Acrilan to Cotton Industry

POSSIBLE uses of Acrilan in the Lancashire trade, as a complement to its present use in the worsted and woollen fields, were outlined by Mr. D. W. H. Galbraith, sales manager of Chemstrand Ltd., when he spoke to cotton and rayon merchants in Manchester on 12 December.

He described the properties of the fibre and listed fields in which it has already achieved trade and consumer acceptance in the UK, notably the worsted, woollen and flax systems.

COAL TAR RESEARCH REVIEWED

Wide Range of Developments in First Half of 1957 Covered

THE Coal Tar Research Association's 'Review of Coal Tar Technology' for the first half of this year has now been published. (Volume ix, Part January-June, 1957—price to non-members of CTRA 10s.) As usual, this review of coal tar and coal tar products and general chemical and chemical technique, provides a wealth of valuable information on new projects, patents and investigations as they concern coal tar technology.

Coal Tar: Under this heading it is learned that fluidised carbonisation of US coking coals has been carried out successfully on the pilot plant scale as a continuous process. Tar yield is approximately 22 galls/ton of coal; on distillation the tar yielded 51.8 per cent pitch of s.p. 100°C, whilst the oils contained 28.5 per cent tar acid and 2.9 per cent bases. The SEGAS process, it is reported, is operated at Hamelin gasworks and a report confirms the efficiency of the plant. Tar yields of 0.04 kg/cubic metre of gas or 0.06 kg/kg of oil feed are being obtained. Two SEGAS plants have been installed at Ponders End gasworks.

It is pointed out that a US patent covering a method for dehydrating tar (USP 2,765,541) was substantially that claimed by Koppers GmbH in BP 753,249. Reduction or removal in content of suspended carbon (C_1) in tar by screening by Koppers Co. in a patent process; the extent to which C_1 content is reduced depends on the screen mesh and the time of running. The apparatus is simple, consisting in the main of a woven wire screen, through which tar is pumped. For the continuous distillation of lignite and coal tars, the US patent 2,766,190 granted to Rütgerswerke AG is stated to appear to be equivalent of BP 692,364.

Continuous Tar Distillation

From a study of the functioning of a Russian continuous tar distillation plant, it is concluded that a single fractionating column is as effective as a series of columns. A scheme has been patented by the Yorkshire Tar Distillers Ltd., which reduces the oxygen absorption of tar works effluent (BP 777,382). The effluent is fed to the vapour stream, leaving a continuous tar still fractionating column. The company claim that in one case oxygen absorption was reduced from 3,600 p.p.m. to 200-400 p.p.m.

Of interest is the observation that attack on mild steel at 90°C in the absence of oxygen, is much more severe by aqueous ammonium thiocyanate than by aqueous ammonium chloride (BP 766,008).

Primary fractions: In examining reports on primary fractions, it is reported that improvements in the treatment of benzolised wash oil have been patented by Koppers Co., Inc. (USP 2,785,114). It is claimed that a benzene-rich fraction can be recovered in better yield from a coke-oven wash oil by taking a benzene-naphthalene fraction off the top of a fractionating tower at a temperature above the condensation point of the steam, fractionally condensing the naphthalene and water and returning the naphthalene fraction to the top of the tower.

In a patent of H. Koppers BmbH, Germany (BP 766,120) benzolised wash oil from a tube furnace is introduced into a fractionating column with steam, the distillation product condensed and part withdrawn, the remainder returning as reflux. Oil is withdrawn from the column above the stripping section and vaporised in a tube furnace to form a vapour and residue, the vapour being readmitted to the column above the withdrawal point; a 95 per cent light oil is produced.

Fillers for Bitumen

The advantage to be gained by adding mineral fillers of small particle size to bitumen is indicated in a British patent to a Swedish company (BP 775,502). As the mean size of filler is decreased below 0.2 micron, increase in softening point is marked. The brittle point of the bitumen is unchanged by the addition, and it is claimed that there are improvements in elasticity, durability and moisture impermeability.

Tar Acids: In this section a new method of phenol extraction reported from a Polish source is noted. It is claimed that phenols can be removed from coal tar or from oils by means of selective solvents, provided that suitable diluents such as aliphatic hydrocarbons, naphthenes or their mixtures are added. The Californian Research Corporation (USP 2,762,838) has described the production of phenols from aromatic carboxylic acids. Liquid phase oxidation of carboxylic acids at 475°F with oxygen in the presence of a copper or copper oxide catalyst yields the phenolic ester, carbon dioxide being evolved. The ester is then hydrolysed with aqueous/alcoholic alkali. A 12 per cent yield of phenol of purity 82 per cent was obtained from benzoic acid.

The removal of sulphur compounds from tar acid is stated to have engaged some attention in a process evolved by the Pittsburgh Consolidation Coal Co. (USP 2,767,220). Crude tar acids freed from neutral oils are subjected to a continuous counter-current double-solvent extraction with 55 to 75 per cent aqueous methanol and a paraffinic naphtha fraction of boiling range 60 to 100°C and of density < 0.75. Sulphur compounds are removed in the naphtha base. In a British equivalent of this patent (BP 766,710) the methanol concentration is given as 40 to 90 per cent and the boiling range of naphtha 60 to 130°C. The process is claimed to be particularly applicable to the treatment of caustic-extracted tar acids. A very different method is described by NV de Bataafsche Petroleum Maatschappij (BP 765,578 and USP 2,764,618). The phenols obtained by springing alkali metal phenolates are distilled in the presence of 0.05 to 5 per cent free sulphur and an alkali in such proportions that an oxidising atmosphere is maintained. The degree of desulphurisation achieved is stated to be much greater and the time much shorter than with the older method of two separate stages of desulphurisation and distillation.

For the determination of phenol and *o*-cresol in phenolic resins, Czech workers (*Chem Listy*, 1956, **50**, 1456-8) recommend paper chromatography between two horizontal glasses, using a mixed *cyclo*-hexane/chloroform/ethanol solvent and a diazotised p-nitro- aniline developer.

Infra-red-spectrophotometry has been used by Japanese workers (*Mikrochim Acta*, 1956, 1573-84) in analysis of a distillation fraction of saponated cresols in carbon disulphide for *o-m* and *p*-isomers. It is claimed that the three isomers can be determined with one per cent error.

Tar Bases: An item of interest noted in the section on 'Tar Bases,' quotes a Polish source which affirms that spent sulphuric acid should be diluted to 25 to 30 per cent and used for the treatment of crude benzene (containing 0.2 to 0.4 per cent bases) before it is refined. Base sulphates may then be recovered by saturating the acid with ammonia. It is also pointed out that oil left over from naphthalene crystallisation contains up to five per cent bases, the recovery of which can be achieved by first separating the phenols and neutralising the bases. (*Koks Smola Gaz*, 1956, **1**, 68-71).

Aromatic Hydrocarbons

Monocyclic aromatic hydrocarbons: These are dealt with in Section 5. Under production, a patent to Bergwerksgesellschaft Hibernia AG, is described (BP 765,156) which claims that yields of benzene and its homologues of up to 85 per cent are obtained when saturated or unsaturated gaseous hydrocarbons are passed over a cracking/aromatising catalyst at 700°C to 750°C and at pressures up to 100 (preferably 10 to 20) atmospheres. The catalyst consists of coke which has not come in contact with air and on which metallic oxides are deposited. Examples quoted are 3 per cent Al_2O_3 and one per cent Cr_2O_3 and the conversion of pentane at 725°C and 10 atmospheres pressure to aromatics in 85

per cent yield is described.It is noted that many more patents have been granted covering aspects of the manufacture of phthalic acids, especially terephthalic acid.

Polycyclic Aromatic Hydrocarbons: The principles and operation of the Dynocone continuous centrifuge described by Kelsey are noted (*Gas World*, 1957, **145**, 2, coking section). Kelsey has stated that when this apparatus is used for the separation of naphthalene the results are more encouraging than those obtained by the use of solid-bowl centrifuges. It is pointed out, however, that there is no indication whether a whizzed naphthalene of consistently high crystallising point could be so produced.

A modification has been reported by Union Carbide Corporation regarding the removal of oxidisable impurities such as thionaphthene from naphthalene. The aliphatic per acid used can contain one, three or four carbon atoms and is reacted with the impure naphthalene at 25°C to 85° C, either as a solution, in acetone, or on formation *in situ* from the normal acid and hydrogen peroxide, preferably with a catalyst such as sulphuric acid (BP 777,532; USP 2,779,722).

Russian work (*Zhur. Priklad. Khim.*, 1956, **29**, 1270-5) is noted, whereby tetralin and decalin may be dehydrogenated, in the presence of ethylene oxide at 500°C to 600°C to naphthalene, some cracking to benzene and homologues also taking place.

Naphthalene Oxidation

Reference is made in the review to several more papers on aspects of the conversion of naphthalene to phthalic anhydride. Alessandro and Farkas (*J. Colloid Sci.*, 1956, **11**, 653-70) have reported on the oxidation of naphthalene over pellets of fused vanadium pentoxide, vanadium pentoxide on active alumina and alundum; and vanadium pentoxide/potassium sulphate supported on silica gel catalysts has been studied kinetically. A fluidised venadium pentoxide/potassium sulphate/silica catalyst caused consecutive oxidation of naphthaquinone to phthalic anhydride to carbon dioxide.

Russian investigators, it is recorded, have measured the porosity of an industrial fused vanadium pentoxide catalyst by determining the rate of carbon dioxide diffusion through a sample film. The pores were found to be 10^{-4} to 10^{-5} cm. wide. Oxidation of naphthalene over such a catalyst proceeded in the inner diffusion range at temperatures up to 400°C and then changed over to the outer diffusion range, the changeover being accompanied by a sharp rise in temperature of the catalyst and a fall in selectivity (*Korneichuk, Zhur. Fiz. Khim.*, 1955, **29**, 1073-9).

Utilisation of coal tar and its products: It is reported that there have been few outstanding publications on road tar.

A patent to Crespi (BP 754,533) describes furnace wall or roof blocks prepared from bauxite, dolomite, talc, etc., bound with coal tar or pitch and small quantities of alkali silicates or an organic binder such as molasses.

In the note on 'Plastics and Resins,' reference is made to Japanese work on resins produced by the condensation of creosote oil with formaldehyde. These were found to be too brittle to be of practical use, but harder products were obtained by condensation of creosote with phenolformaldehyde and from polyethylene glycol fumarate and anthracene. Potential uses of these resins have been suggested.

A useful addition to the literature on physico-chemical behaviour of polymer-solvent systems, is stated in the review to be that of Zettlemayer and Vanderryn, who have studied the compatibilities of coumarone-indene resins-solvent systems. In each case the molecular weight was determined by cryoscopic determinations, and the softening point by the ring and ball method. These authors have come to the conclusion that the solubility of an unfractionated polymer is mainly controlled by the fraction of highest molecular weight. With critical concentrations the resins have been found to act like polymers of high molecular weight (*Ind. Eng. Chem.*, 1957, **49**, 220-5).

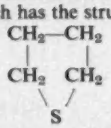
A small note of interest is a new material quoted in a Ministry of Supply specification (DTD 5542, 1957) as being suitable for removing hard films of organic contaminants or protectives from metal surfaces. This is basically cresol and *o*-dichlorobenzene, to which corrosion inhibitors may be added.

The second part of the 'Review of Coal Tar Technology' is concerned with general chemistry and chemical technique.

Odorant for Hydrocarbon Gases

TETRAHYDROTHIOPHENE is now being produced on a commercial scale by Robinson Brothers Ltd., Ryders Green, West Bromwich. The company believes it is the first British chemical manufacturer to produce tetrahydrothiophene on this scale. The compound has recently come into prominence as an odorant for odorising colliery methane and re-formed petroleum gases before being used for town gas.

Alternative nomenclature for tetrahydrothiophene which has the structural formula



is thiophane, tetramethylene sulphide or thiocyclopentane. It is a colourless liquid, with a coal-gas-like odour.

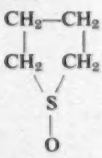
Molecular weight of tetrahydrothiophene is 88.13. At 95 per cent W/N purity; the boiling range is 80 per cent between 120°C and 123°C and 90 per cent between 120°C and 127°C. Specific gravity $\frac{20°}{15}$ is 1.001; refractive index $n_D^{20°}$, 1.5012; acidity (expressed as mg.HCl/gm.) 0.04, and the flashpoint is at 64°F.

According to Haines *et al.*,(1) material of 99.5 per cent purity had a freezing point of —96.16°C. The cryoscopic constant (A deg. $^{-1}$) was 0.028, boiling point 120.9°C density at 20°C of 0.99869 gm./ml.; viscosity at 20°C, 1.042 centepoises. With regard to solubility, tetrahydrothiophene is miscible with most organic solvents. It is immiscible with water but it can be steam distilled.

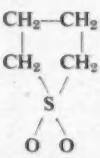
Chemically tetrahydrothiophene is a cyclic sulphide, and as such is not chemically very active. It forms addition compounds (1 molecule of tetrahydrothiophene and 1 molecule of adduct) with mercuric chloride,(2) mercuric iodide,(2) stannic chloride,(3) and bromine.(2) The bromine adduct is very unstable.

With methyl iodide, tetrahydrothiophene reacts to form a sulphonium iodide ($(CH_2)_4S.CH_3I$(4): on being heated with excess methyl iodide under pressure at 130°C, the ring is opened with the formation of 1.4 diiodobutane.(5)

On oxidation with hydrogen peroxide, two different products can be obtained dependent on the amount of hydrogen peroxide used (6). If equilomar amounts are used, tetramethylene sulphoxide is formed. If 2 molecules of hydrogen peroxide are used to 1 molecule of tetrahydrothiophene, tetramethylene sulphone is formed.



Tetramethylene sulphoxide.



Tetramethylene sulphone.

Other oxidising agents which have been used to convert tetrahydrothiophene to the sulphone are nitric acid,(2) potassium permanganate(2) and chlorine.(7). If excess chlorine is used for the oxidation, the ring is opened,(7) and one of the products formed is 1-chloro-4-sulphonyl chloride butane(8).

Tetramethylene sulphone (usually called 'sulpholane') has been extensively investigated as a selective solvent(9)(10). It has a freezing point of 27.4-27.8°C and boils at 285°C/760 mm.(9) The sulphone is only stable below 240°C, and therefore cannot be distilled without lowering the boiling point. This can be done in several ways, i.e. reducing the pressure, or adding a little water(9).

Finally, tetrahydrothiophene can be dehydrogenated to thiophene(11).

Chief use for tetrahydrothiophene is as an odorant for hydrocarbon gases, other than coal gas, used for domestic or industrial fuels. A normal dosage is ¼ to 1 lb. per one million cubic feet of gas.

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Overseas News

OPPORTUNITIES IN SWEDEN FOR UK PESTICIDE MAKERS

THE market in Sweden for British manufacturers of pesticides is discussed in a recent report by the Export Services Branch, Board of Trade. It is considered that Sweden provides a relatively small and fluctuating market for pesticides in which UK manufacturers have an appreciable share, particularly for DDT preparations and hormone weed-killers of the MCPA type. Because of the large number of preparations in the market, only those products which combine effectiveness with safety in application and use and comparative price stand a chance of doing well.

With pesticides the results of scientific research and development can lead to sudden changes in demand and supply, and there should be considerable scope in the Swedish market for UK firms in a position to offer new and effective, but safe, pesticides. The Swedes would, for instance, welcome a new insecticide with the same powerful effect of parathion, but less poisonous. They are interested to know more about phenoxypropionic weed-killers, and any manufacturer able to offer a haulm destroyer which has none of the disadvantages of those at present in use and is safe and effective, is assured of a good market in Sweden.

National Salt Corp. of S. Africa to Acquire New Salt Works

Acquisition of the Salnova salt works is proposed by the National Salt Corporation of Port Elizabeth, South Africa. Payment would be £110,000 and the lease rights of the southern end of the Saldanha Bay basin against a royalty of 2s 6d per ton of salt and the option to purchase £36,000 of National Salt shares at par after three years. The vendor also has the right to draw an advance on the royalties, the report states.

Establishment of saltpans of 100,000 tons capacity in the Saldanha area are planned.

Quebec Lithium to Build Ore Refinery

Agreement to purchase a site at Houses Point, NY, on the Canadian border, has been signed by the Quebec Lithium Corporation, who are to build a £1 million refinery to refine ore from the Quebec Lithium mine in North-western Quebec

Producing Magnesium Hydroxide from Sea Water

Doctor A. Salvagno, of the pharmacy of the Civilian Hospital in Chioggia, has worked out a method of production from sea water of magnesium hydroxide (and subsequently oxide), practically free of chlorine and thus suitable for pharmaceutical purposes. Magnesium hydroxide is precipitated by addition of spent lime to sea water. This precipitate, even if washed for a long time on a filter, does not lose foreign substances due to its semi-colloidal nature. The precipitate is placed into a small centrifugal machine, the container of which has the structure of a wicker basket lined with cotton fabric. The machine is made to spin (about 2,000 r.p.m.) and practically all liquid is eliminated from the precipitate. The resulting mass is placed in a porcelain cartridge which is inserted into a muffle, and subjected to drying at the temperature of 500°C.

The resulting dry substance is subjected to a long grinding to fine powder. This powder is mixed with water (containing no chlorine) and the damp mass thus obtained is subjected to further centrifuging. When the liquid it contains is eliminated, the mass is wetted with a spray of chlorine-free water, without stopping the machine.

This operation of wetting and eliminating water is repeated at least seven times, care being taken to see that each time the mass is treated it receives at least as much water as it weighs. This procedure eliminates chlorine to such an extent that only negligible quantities of it (not more than 40 mg. per kilogramme) are left in the magnesium hydroxide.

If drying at 500°C is omitted from Dr. Salvagno's process, the amount of chlorine left in the hydroxide is found to be much larger (about 900 mg. per kilogramme). It is suggested that drying at high temperature increases the dimensions of crystals and makes them less absorbent, and, therefore, easier to wash.

Colombian Soda Ash Project

The Bank of Colombia is considering an investment of Ps. 13 million (£750,000) in a factory for producing soda ash. The bank runs the salt mines at Zipaqura near Bogota.

One-Package Vehicle for Polyurethane-based Points

The Cargill Company of Minneapolis have developed a one-package polyurethane-based paint vehicle thus avoiding the need for separate packages for the resin and catalyst. Cargill's polyurethane No. 101 is an oil-modified resin. It is claimed that it dries tack-free in 1½ hours, then cures for six to seven weeks.

Tests have included chemical and water resistance, dry and Sward hardness, abrasion and impact resistance, flexibility, gloss and yellowness. In all these, Cargill claim that Polyurethane No. 101 was equal or better than other materials.

High Strength Elastomers by Irradiation

Elastomers with tensile strengths of over 1,500 p.s.i. and elongations at breaking of 100 to 200 per cent have been obtained by irradiation of polyvinyl methyl ether and mixtures of the ether with a variety of fillers with electrons from a Van de Graaff accelerator and gamma rays from cobalt-60.

Although the ether crosslinked, fillers were necessary to give products with much strength. Ordinary chemical methods of crosslinking, or vulcanisation, were ineffective.

This work has been carried out by the US navy and is contained in report PB 131003 'The irradiation of polyvinyl methyl ether with electrons and gamma rays to form elastomers' by D. Duffey. It can be obtained from the Office of Technical Services, US Department of Commerce, Washington 25. Price is $1.

Capital Investment in Europe's Petrochemical Industry

According to the figures supplied by ENI of Italy, the capital invested in petrochemicals by the principal European countries totalled the following amounts (in million US dollars):

	1 Jan. 1955	1 Jan. 1956	1958 (expectations)
UK	122	125	252
W. Germany ...	68	88	178
France	46	47	177
Italy	44	44	125
Belgium, Denmark, Holland ...	10	10	34

As regards the output of petrochemical plants ENI has totalled the following figures (expressed in thousands of tons of carbon content):

	1954	1955	1956 (provisional figures	% increase from 1955 to 1956
UK ...	164	198	224	13
W. Germany	70	110	131	19
France ...	29	37	45	35
Italy ...	16	26	39	50
Belgium, Denmark, Holland	26	26	70	169

Uranium from Sea Water

A chemical process for the extraction of uranium atomic fuel from sea water is claimed by two Russian scientists. The sea water used has been that of the Pacific Ocean taken from the Sea of Japan. The extraction process is said to make use of organic catalysts.

The occurrence of uranium in sea water is of the order of about ½ oz. of uranium for every million gallons of sea water.

Utah May Become Important Phosphorus source

Largest US phosphate rock deposit was inspected recently by Sir Denys Lowson, former Lord Mayor of London, Governor George D. Clyde of Utah, officials of the Federal Bureau of Reclamation, and executives of Stauffer Chemical Co., Western Phosphates Inc., Mountain Copper Co. Ltd., and San Francisco Chemical Co. It is anticipated that the deposit, which is at Vernal, Utah, may become a major source of phosphorus within the next few years and particularly so when the nearby Flaming Gorge Dam, now under construction, is completed.

San Francisco Chemical Co., jointly owned by Stauffer and Mountain Copper Co. Ltd., hold exclusive rights to the huge deposit, which covers some 15,000 acres. Indicated phosphate rock reserves, averaging 21 per cent P_2O_5, approximate 700 million

tons. San Francisco Chemical have been proving up the deposit over the past several years by means of extensive core drilling and tunnelling.

To render the Vernal deposits economically usable, it would be necessary to build a beneficiation plant at the mining site. San Francisco Chemical have developed a beneficiation process which will upgrade the ore for either electric furnace or fertiliser use. This process has been utilised at Leefe, Wyoming, and it is anticipated that a substantial tonnage of the Vernal ore will be treated at Leefe in 1958 to prove out the beneficiation process on a full plant scale basis.

1956 Sales of Plant-Protection Chemicals in Finland

Twenty-two Finnish firms make and import plant protection chemicals. At the present time, 47 different fungicides, 156 pesticides, 20 weedkillers and 12 preparations used as either fungicides or pesticides are marketed.

Sales of mercuric seed dressing preparations totalled 177 tons which amount was sufficient to dress almost 50 per cent of seed used in 1956. Consumption of copper sulphate and copper oxides was 11 tons; that of lime sulphur, 30 tons; of captan plus TMTD, 10 tons; and of PCNB dust, 10 tons.

Agricultural pesticides contained a total of 8.6 tons parathion, 1.2 tons malathion, 7.2 tons of DDT and 0.5 tons of lindane. Sales of agricultural dusts were 337 tons. Marketed household, storeroom and cowshed pesticides contained 0.34 tons of parathion, 4.9 tons of DDT, 1.5 tons of lindane and 0.33 tons of pyrethrum. The most important rodenticides were diconmarin preparations, for which 126 kg. of diconmarin were used.

Weedkiller sales showed an increase on those of 1955. Consumption of M-type hormone was 303 tons; that of EE-type hormone, 41 tons; of chlorinated acetic acid preparations, 47 tons and of non-selective weedkillers, 104 tons.

South African Uranium Exports

A preliminary estimate by the Department of Excise and Customs, South Africa, puts the value of South African exports of prescribed materials (uranium and thorium) under the Atomic Energy Act in October at £6,860,999, making the accumulative total so far this year £41,970,014. In September this year exports were valued at £3,498.325, and in October of last year at £3,020,144. Total for the 10 months last year was £30,845,170.

US Polythene Plants

Latest low-pressure polythene plant to come on stream in the US is that of W. R. Grace at Baton Rouge, La., US. This plant has a production capacity of 50 million lb. a year of polythene to be produced by the Phillips process.

Constructed in less than 15 months, Grace have been using a $1 million 1,000-lb.-per-day semi-works plant as a process proving plant. Now that the main plant is on stream it is planned to use the pilot plant to make copolymers of ethylene and other olefins in 'the near future'. It is also stated that Grace plan further work with Phillips-type polythene modifying it for specific uses.

Now nearing completion are several other polythene plants. Due on stream early in 1958 is that of Koppers' Port Reading, New Jersey, plant. Also to be producing shortly are Union Carbide's Ziegler-type plant at Institute, West Virginia, and their Phillips-type plant at Seadrift, Texas.

Austrian Fertiliser Plant Plans Increased Production

For the fertiliser year 1958-59 beginning in July of next year, the Austrian Nitrogen Works of Linz, Upper Austria, plan to increase their annual productive capacity to one million tons. Output of nitrogenous fertiliser is to reach about 700,000 tons; superphosphate from 80,000 to 100,000 tons, and sulphuric acid from between 70,000 and 80,000 tons.

Japan's Synthetic Rubber Plan

With support from the Japanese Government, Japan Synthetic Rubber Co. has been formed under a special law passed earlier this year to stabilise the price of rubber.

Since 1955, preparations have been under way with the Japanese petroleum industry for the establishment of a synthetic rubber plant.

The new company has as its backers the leading members of the Japan Rubber Industry Association. It will manufacture and sell raw synthetic rubber and finished products, in addition to carrying out research work. Production of 30,000 tons during the first year of operations is planned, with 35,000 tons in the second year and 40,000 tons in the third year. By the fifth year it is hoped that 50,000 tons a year will be produced. The company is expected to conclude agreements for technical assistance with major US rubber companies including Goodyear.

It is reported that it is planned to establish the company's main plant at Gokkaichi, near the large oil refinery owned by the Shell Oil Co.

Nominal capital of the company is 2,500 million yen (about £2.5 million sterling) with initial paid-up capital of 625 million yen (about £625,000). To begin production the company is estimated to require about £15.9 million. Of this sum £5.9 million is to be borrowed from the Government's Japan Development Bank, with a similar sum being borrowed from private banks.

Carbide Coating for Graphite

A process for putting a carbide coating on machined graphite parts has been developed by Horizons, Inc., US. The coating is stated to be integrally bonded to the graphite, its smoothness depending on the smoothness of the base graphite, and to be complete even in undercuts, holes, drilled areas, milled sections, etc Thickness of the coating can be varied between 40 and 250 microns; above this limit the material tends to flake off.

Applications suggested for the process are in liquid nuclear reactor cores, graphite fixtures, containers used to evaporate metals and the like.

US Spending on Chemical Process Industry Highest on Record

ECONOMISTS in the US are predicting some business recession for 1958. If a recession began, it is predicted that it could be a long one.

According to the latest information in *Baird-Facts*, business investment will decrease 5 per cent, production 1 per cent and profits 3 per cent. Chemical businessmen appear to be confident that 1958 will be an excellent year, a view upheld by a survey by the US magazine *Newsweek*, which states that the US chemical industry will remain that with the greatest expansion with a gain of 5 per cent in sales.

Chemical process industry capital expenditures for 1957 and 1958 will be the highest on record, but capital spending for chemicals will decline about 12 per cent.

In the third quarter, profit margins showed a continuing decline having dropped from 9.4 per cent at the end of the second half to 8.9 per cent. However, the third quarter is usually the poorest. In any case it is reported that although 24 leading US chemical companies had profit reductions in the second quarter of this year, only 14 declined in the third quarter.

Market trends in the US show that plastics output is increasing all the time. Vinyl resins, now 845 million lb., are expected to reach 1.2 billion lb. a year by 1961. US imports of p.v.c. resins, now 15 million lb. annually, are expected to decrease to 10 million lb. in 1961, and US exports to remain steady at 45 million lb. a year. At present imported p.v.c. resins are selling at $0.22/lb. compared with the US domestic price of $0.27/lb. US producers are hoping to reduce their prices to compete with the imported price level. US production of p.v.c. is expected to be 645 million lb. Estimates for 1957 and 1961 for US resin production are: p.v.c. polymer 400 million lb. and 610 million lb. respectively; p.v.c. copolymer, 250 million lb. and 325 million lb.; p.v.c. acetate, 85 million lb. and 125 million lb.; p.v. butyral, formal and alcohol, 55 million lb. and 75 million lb.; polyvinylidene, 55 million lb. and 65 million lb.

Markets are weak for chlorinated hydrocarbons such as chloroform, carbon tetrachloride, methylene chloride and perchloroethylene. Production of organic sequestrants for this year is put at 11.8 million lb. —a 14 per cent increase from 1956. Sales are estimated at 10 million lb. only however.

Chemical requirements of the car industry are expected to be 3.5 billion lb. next year. The average US car in 1958 is estimated to have 1.6 lb. of acetate butyrate, 1.2 lb. of nylon (excluding tyres), 2.2 lb. of phenolics, 2.3 lb. of polyvinyl butyral, 3.5 lb. of p.v.c. and 3.1 lb. of other plastics. Phenolics used in shell moulding at present total about 30 million lb. and are expected to increase in 1960 to 45 million lb. Fuel additives are expected to reach 500 million lb. a year and oil additives the 400 million lb. a year level by 1960.

PEOPLE in the news

● COLONEL H. F. KEMBALL is resigning, on 31 December, his appointment as managing director of Kemball, Bishop and Co. Ltd. He will retain his seat on the board and continue as deputy chairman. Colonel Kemball has been associated with Kemball, Bishop since 1905. He was appointed joint managing director in 1913 and since 1948 has been the sole managing director. MR. R. F. KEMBALL and MR. W. W. MUIR have been appointed joint managing directors as from 1 January 1958.

● MR. GEOFFREY WILFRED HEMY has been appointed chemical sales director of Joseph Crosfield and Sons Ltd. and William Gossage and Sons Ltd., Warrington. He succeeds MR. A. C. H. CAIRNS, who has left to become managing director of Unilever Export Ltd. Mr. Hemy has spent practically the whole of his business life with the United Africa Co. Ltd., latterly as manager of the drugs and perfumery department.

● MR. J. G. WINDOW, sales director of QVF Ltd., Stoke-on-Trent, completed a tour of the US by attendance at the company's stand at the 26th Exposition of Chemical Industries in New York from 2 to 6 December. His reports indicate a good reception for his company's industrial glassware. Mr. Window found that while the largest buttress end pipes made locally were 6 in. in diameter, he was able to offer a range, including pipes, heat exchangers and a wide range of equipment in diameters of 9, 12 and 18 in.

● MR. A. H. WILSON, F.R.S., a managing director of Courtaulds Ltd., has been appointed an additional deputy chairman. He retains his managing directorship. MR. C. F. KEARTON, O.B.E., has been appointed an additional managing director.

A. H. Wilson

● MR. R. H. THOMAS, O.B.E., a member of the National Coal Board, was elected president of the British Tar Confederation at the recent annual general meeting. Other appointments were: *Hon. treasurer*, MR. L. W. BLUNDELL; *chairman of the executive board*, MR. STANLEY ROBINSON; *vice-chairmen of the executive board*, SIR HENRY F. H. JONES and LT.-COL. P. F. BENTON-JONES. The board for the year 1957/58 is:

Representing the Association of Tar Distillers: Mr. L. W. Blundell, North Thames Gas Board; Mr. E. P. Butler, Bristol and West Tar Distillers Ltd.; Mr. E. E. Carey, South Eastern Gas Board; Mr. E. Hardman, E. Hardman, Son and Co. Ltd.; Mr. R. T. Hayes, United Coke and Chemicals Co. Ltd.; Mr. C. Lord, Lancashire Tar Distillers Ltd.; Mr. Wm. McFarlane, Scottish Tar Distillers Ltd.; Mr. Stanley Robinson, Midland Tar Distillers Ltd.; Mr. J. B. Vickers, Yorkshire Tar Distillers Ltd.; Mr. W. A. Walmsley, Thomas Ness Ltd.

Representing the British Coking Industry Association: Lt.-Col. P. F. Benton-Jones, O.B.E., United Coke and Chemicals Co. Ltd.; Mr. K. McK. Cameron, Stanton Ironworks Co. Ltd.; Mr. T. R. Craig, O.B.E., T.D., Colvilles Ltd.; Mr. C. F. Dutton, National Coal Board; Mr. J. Y. Feggetter, National Coal Board (Durham Division); Mr. C. M. Frith, South Yorkshire Chemical Works Ltd.; Mr. I. Hall, National Coal Board (North Eastern Division); Mr. W. D. Holt, National Coal Board (East Midlands Division); Mr. A. Slater, Staveley Iron and Chemical Co. Ltd.; Mr. C. F. Sullivan, National Coal Board (South Western Division).

Representing the Gas Council: Mr. S. Black, Northern Gas Board; Mr. R. N. B. D. Bruce, O.B.E., T.D., North Thames and Eastern Gas Boards; Mr. D. D. Burns, O.B.E., Scottish Gas Board; Mr. James Carr, O.B.E., M.C., Southern and South Western Gas Boards; Mr. E. H. Harman, East and West Midlands Gas Boards; Mr. W. Hodkinson, O.B.E., North Western Gas Board; Mr. W. K. Hutchison, C.B.E., South Eastern Gas Board; Sir Henry F. J. Jones, M.B.E., Gas Council; Mr. A. McDonald, North Eastern Gas Board; Mr. J. Powdrill, M.B.E., Wales Gas Board.

Representing the Low Temperature Coal Distillers Association of Great Britain Limited: Commander Colin Buist.

● MR. N. C. LAKE has been appointed a director and deputy managing director of Head Wrightson and Co. Ltd. He will be responsible for the co-ordination of the group sales to the iron and steel industry. Mr. Lake was formerly managing director of the Head Wrightson Machine Co. Ltd. MR. DOUGLAS DODDS-PARKER, M.P., has joined the board of the Head Wrightson Export Co. Ltd.

● DR. E. SCHEUER, head of International Alloy's Laboratories, and DR. G. J. THOMAS, formerly branch manager of the Birmingham works, have been appointed directors of the company. Dr. Thomas will be the works director and MR. F. G. BACON, lately works director, will become the commercial director.

MR. H. C. BLENCH and MR. S. SANDERS, having reached retirement age, are relinquishing their directorships at the end of this year.

● MR. S. J. WOMMACK has been appointed assistant general manager of the nuclear fuel division of Olin Mathieson Chemical Corporation, New York. He has been general manager of the chemical and industrial manufacturing division of the Olin Mathieson International Corporation. In his new position he will direct the activities of the production, technical and quality control departments.

● MR. S. R. FINN (Vulcan Products Ltd.) has been elected chairman of the Surface Coating Synthetic Resin Manufacturers' Association for 1957/58. Vice-chairman is MR. A. W. R. THOMAS (Styrene Co-Polymers Ltd.). The treasurer is MR. A. F. SMITH (W. A. Mitchell and Smith Ltd.) and MR. E. G. SANGSTER is the secretary.

● MAJOR CUTHBERT JOHNSON, M.B.E., manager of the precious metals refinery, of the Mond Nickel Co. Ltd., will relinquish his appointment on 31 December, having reached retirement age. During 38 years' service with the company he has been responsible for their precious metals production in this country. He joined the firm in 1919 as manager of the experimental precious metal refinery in Southwark and directed the process researches which formed the basis for the present refinery, now one of the largest in the world. Major Johnson will be succeeded by MR. A. R. RAPER.

Major Johnson

● MR. W. G. FREEMAN, Evans Medical Supplies Ltd., has left England to take up an appointment as manager of the newly formed branch of Evans Medical (Nigeria) Ltd., at Aba, Eastern Nigeria.

● Visiting this country from Canada is DR. DAVID E. JONES, president of the Electric Reduction Co. of Canada Ltd., producers of phosphorus chemicals. The company are also producers of sodium chlorate, important in uranium ore processing and paper pulp production. Dr. Jones is accompanied by MR. R. M. O. MAUNSELL, vice-president in charge of research and development. Dr. Jones is here to discuss further expansion plans with the parent chemical company, Albright and Wilson Ltd.

● MR. DAVID M. MOULDEN a former lecturer in the School of Pharmacy at London University, who has gained his Ph.D. degree, is to take up a post as a chemical engineer with Imperial Chemical Industries, dyestuffs division, at Grangemouth, Stirlingshire.

● On 22 January 1958 MR. KENNETH WILSON, who is 72, will retire from the board of Albright and Wilson Ltd. This

Sydney Barratt, who is to succeed Kenneth Wilson as A&W chairman

will be the 50th anniversary of his joining the company. He has accepted the honorary title of president of the company. MR. SYDNEY BARRATT, managing director, will succeed Mr. Wilson. Mr. Barratt joined the company in 1932 as assistant director of research. He was appointed to the board in 1938, became finance director in 1953 and was appointed managing director two years later. He has been closely associated with the group's post-war expansions outside the phosphorus field. Mr. Wilson became chairman in 1932 when the company's assets were only £1.5 million. He has played a leading part in plans for further expansion which has yet to come.

Mr. Wilson has been a director of the British Match Corporation, and of Bryant and May Ltd., since 1932, and vice-chairman of the latter since 1953. A founder member of the Chemical Employers' Federation in 1917, he became vice-chairman in 1936 when the federation was reconstituted as the Association of Chemical and Allied Employers, and was acting chairman from 1936 to 1945, and chairman from 1945 to 1948. When he retired from the chair, he was made a life vice-president, an office specially created for him.

Mr. Wilson joined the council of the Association of British Chemical Manufacturers in 1931, following the death of the Rt. Hon J. W. Wilson, one of the founder members of that body when it was formed in 1916. Mr. K. H. Wilson is now hon. vice-president.

● MR. H. B. LLOYD, technical services superintendent at Workington Iron and Steel Co., a branch of the United Steel Companies Ltd., has left the company to take up another appointment. He will be succeeded on January 1 next by MR. D. R. G. DAVIES, who is at present chief chemist and control metallurgist. MR. L. JACKSON will succeed Mr. Davies as chief chemist.

● PROFESSOR J. P. BAXTER, chairman of the Atomic Energy Commission of Australia and vice-chancellor of the NSW University of Technology and SIR LESLIE H. MARTIN, professor of physics at Melbourne University, are to visit New Zealand in January to advise on the development there of nuclear science.

● SIR HENRY J. ROSS retires from executive duties with the Distillers Co. on 31 March 1958. He will also retire from chairmanship of the company, although he will remain a director. SIR GRAHAM HAYMAN will succeed Sir Henry from 1 April 1958. MR. WILLIAM REID will succeed Sir Graham as chairman of the management committee. Sir Graham, who has been a director of Distillers' for nearly 20 years, is especially interested in the chemicals and plastics side of the business. On becoming chairman he will relinquish executive duties with the group. He is a director of several other companies, including the British Tyre and Rubber Co., of which he is chairman. Sir Henry J. Ross has served Distillers' for nearly 50 years. The son of William Ross who built up the company, he has been a director since 1925 and chairman since 1952. He will remain a director and has been appointed life president of the company.

Sir Graham

Sir Graham is a past-president of the Association of British Chemical Manufacturers.

Presentation at Geigy Dinner

Six members of the Geigy Co. Ltd., all with 25 years' service, were presented with gold watches at the annual staff dinner recently. They are l. to r.: Mr. J. Hardman, chief clerk, dispatch office; Mr. H. Jones, joint assistant managing director; Mr. J. L. Macintyre, technical sales representative; Mr. F. Monaghan, technical sales representative; Mr. G. A. Campbell, joint assistant managing director; and Mr. W. R. Leigh, technical sales representative

Specifications for Pure Reagents

A QUESTIONNAIRE is being sent out by a joint committee representing the Polarographic Society, the Society for Analytical Chemistry, the Society of Chemical Industry, the Association of Public Analysts and the Department of Scientific and Industrial Research, for the purpose of drawing up specifications for purer reagent chemicals.

This was stated by Mr. W. J. Parker, secretary, at a meeting of the Polarographic Society on 12 December. The committee was announced at the meeting 'Polarography in Industry' held in October (see CHEMICAL AGE, 2 November, p. 721) when a discussion centred on the fact that many 'pure' reagents contained reagent blanks greater than the unknowns to be determined.

At the meeting on 12 December a talk was given by Mr. P. J. Placito, Hawker Siddeley Nuclear Power Co., on 'Problems associated with the determination of oxygen and other constituents of liquid metals and fused salts'. This was followed by a discussion.

Assay of Vitamins and Amino Acids

METHODS of assay for vitamins A and E together with the methods best suited for members of the vitamin B complex were described in a lecture on 'Present trends in the analysis of feeding stuffs' by H. Pritchard, an analytical and consulting chemist, before the Society for Analytical Chemistry on 7 December.

The assessment of protein by microbiological assay of the amino acids and the 'available lysine' test were also dealt with. All these tests, said Mr. Pritchard, were well suited for use in the general analytical laboratory.

New Plant Will Make Aviation Fuel Component

Work on a new plant for the production of an important aviation gasoline blending component is now in progress at Shell Petroleum Co.'s Stanlow Refinery, Ellesmere Port, Cheshire. Costing £800,000 and designed by Universal Oil Products Co. this new Udex unit, as it is called, is expected to be in operation by mid-1958. It will use as feedstock the products from the nearby £3¼ million platformer unit completed in 1953. The design incorporates six columns, the two tallest being the 120-ft. solvent stripper and the 77-ft. extraction column.

Obituary

MR. W. B. H. GALLWEY, died on 14 December, aged 51. He was chairman and managing director of Union Carbide Ltd., chairman of British Acheson Electrodes, chairman and managing director of Gemec Chemical and Kernet Products, and a director of Bakelite Ltd.

Will

MR. GILBERT RITCHIE, chairman of the Parozone Co. Ltd., formerly a missionary in China, who died on 9 August, left £33,682.

Commercial News

Distillers Half-year Profits up, Interim Dividend Increased

TRADING results for the half-year were satisfactory, and the trend to date has been favourable, states Distillers Co. Ltd., in announcing that the trading profit of the group for the half-year ended 30 September 1957 after charging depreciation is estimated at £11,360,000 compared with £11,244,000 for the corresponding period last year.

After crediting income from trade investments, charging interest on debenture and loan stocks, and eliminating the interests of outside shareholders, the net profit before taxation attributable to the company is £10,988,000 compared with £10,760,000.

The board have declared an interim dividend on the ordinary capital for the year ending 31 March 1958 of 7½ per cent against 6 per cent a year ago to shareholders on the register at 12 December 1957. The increase in the interim is solely intended to reduce the disparity between the interim and final dividends.

The measures being taken to combat inflation, and the increasingly competitive conditions for the company's industrial products, inevitably create some uncertainty as to the future outlook but the outlook is considered favourable.

Aspro-Nicholas

In the first six months of the current trading year to 30 September 1957 for Aspro-Nicholas, estimated group trading profits and investment income totalled £375,000 against £323,000 in the corresponding 1956 period.

Mr. M. A. Nicholas, chairman, states that the results 'are good' and current trends in group sales and trading profits continue to be satisfactory. An interim dividend of 6 per cent (same) is declared. Last year the total dividend was 24 per cent.

Boots Group

With a view to simplifying its internal administration and increasing the marketability of certain classes of its fixed interest capital, the Boots group of companies are applying to the Court for directions to proceed with a scheme for the replacement of the preference shares of the retail subsidiary companies by an appropriate amount of 6 per cent unsecured loan stock of the parent company, Boots Pure Drug Co. Ltd. The new stock would have a 25-year life, redeemable at the option of the company after 20 years.

It is envisaged that holders of 7 per cent preference or preferred ordinary shares of the retail companies would receive 23s 4d of new stock for every one preference or preferred ordinary share held; holders of 6 per cent preference shares, 20s 3d new stock for every one share held, and holders of 5 per cent preference shares, 18s 4d of new stock for every one share held.

So far as concerns this scheme the Boots group consists of the parent, Boots Pure Drug Co. Ltd., and five retail subsidiary companies—Boots Cash Chemists (Northern) Ltd., Boots Cash Chemists (Lancashire) Ltd., Boots Cash Chemists (Eastern) Ltd., Boots Cash Chemists (Southern) Ltd., and Boots Cash Chemists (Western) Ltd.

Johnson Matthey

Interim dividend being paid by Johnson Matthey Ltd. is 3 per cent (same). The total dividend paid last year was 10 per cent.

C. C. Wakefield & Co.

C. C. Wakefield and Co., manufacturers of lubrication oils, have entered into a contract to purchase the capital of Fletcher Miller on 1 January.

Fletcher Miller are the parent of a group of 10 companies manufacturing a wide range of cutting fluids, rust preventives, quenching oils and machine tool lubricants, particularly for the engineering industry and leather trade. The business is complementary to that carried on by Wakefield.

Consideration will be £1,008,000 and the allotment of 350,000 Ordinary 10s shares. At the existing price of Wakefield Ordinary 37s 6d the deal would involve about £1,664,250.

Profits of the Fletcher Miller group for the year ending 31 March, 1958, are expected to be substantially the same as the £289,822 returned for 1956-57 before charging tax. Average profits for the past seven years were £248,965.

It is proposed to invite the present chairman of Fletcher Miller, Mr. S. R. Miller, to join the board of Wakefield.

NEW COMPANIES

HYDROPAK LTD. Cap. £3,000. Manufacturers of and dealers in medicated heat pads and heating apparatus, plasters, liniments, etc. Directors: I. C. Greenham and E. A. Harris. Reg. office: 209B Great Portland Street, London W1.

LIXALL PRODUCTS LTD. Cap. £1,000. Manufacturers of and dealers in sanitary sweeping preparations, cleansing and disinfectant materials, etc. Directors: F. J. and A. Kessler. Reg. office: 17 Brazennose Street, Manchester 2.

LONDON COALBINDER LTD. Cap. £100. Manufacturers of and dealers in coal, coke and other fuel, chemical products, lime, ores, etc. Directors: C. L. Walker, E. Herrmann, chemical engineer. Reg. office: 79 Grosvenor Street, London W1.

METROTECT LTD. Cap. £1,000. Manufacturers of and dealers in thermoplastic bituminous enamels, solutions and associated products, protective coatings for pipe, line, still or vessel, land and marine structures, etc. Directors: T. Brown, C. E. Gray, J. Collings, T. L. Kinton and G. McHardy. Solicitors: Linklaters and Paines, 59–67 Gresham Street, London EC2.

SUDZENE LTD. Cap. £500. Manufacturers of and dealers in chemicals, gases and disinfectants, dyes, pigments, oleaginous compounds, etc. Directors: K. Rowell, 15 Marlowes, Hemel Hempstead, Herts, and H. R. York.

11 PLUS LTD. Cap. £500. Manufacturers of and dealers in chemicals, gases, etc. Directors: T. W. Carter, K. Rowell, H. J. M. Hopkin. Reg. office: 37/38 Haven Green, Ealing, London W5.

Market Reports

VOLUME AT SEASONAL NORMAL

LONDON There is not much of fresh interest to report on the industrial chemical market during the past week. In most cases the chief consuming outlets are taking regular deliveries against contracts and buyers are entering into new forward commitments. New spot business remains at a steady level and the volume of export enquiry continues on a satisfactory basis. Business in fertilisers is only moderate, but not less in volume than is normal for the period. The tone of the market is firm with prices moving within narrow limits. Fluctuations in non-ferrous metal prices are reflected in price adjustments of the chemical companies.

After a steady decline, quotations for dry white lead and red lead have recovered a little, the basic prices as from 17 December being dry white lead, £115 15s per ton, and the red lead, £104 5s per ton.

Pitch is an active item in a steady coal tar products market, and the call for creosote oil, cresylic acid and the light distillates remains good.

MANCHESTER While fresh bookings on the Manchester chemical market during the past week have been on a smaller scale, probably due to stocktaking and other year-end influences, deliveries of the soda compounds and most other leading heavy chemicals have kept up fairly well, and a steady movement on shipping account has also been reported. Prices generally are well held, though due to the fluctuations in the metals the position of the non-ferrous metal compounds remains uncertain. A moderate aggregate business has been reported in the fertiliser materials. Carbolic and cresylic acids and creosote oil are fairly active sections of the tar products market.

GLASGOW Trading from most sections of the Scottish heavy chemical market has been steady during the past week. As reported last week, contract requirements for next year are coming under review and covering the usual fairly wide range of chemicals. Little or no change in prices has taken place. Considerable action is still being shown in regard to export.

Chemical Stocks and Shares

STEADIER TENDENCY IN MARKETS

THE last two weeks on the whole have remained in a very inactive mood, but nevertheless have held firm and attracted some small buying from investors interested in cheap stock.

The new BP issue has played a prominent part in holding the rein on markets. Chemical shares generally have had no marked activity and one cannot foresee any renewed active interest this side of Christmas.

Looking to the future, apart from one or two small corporation new loans, markets look all set for a sure but slow recovery. Over the next two weeks, however, investors are well advised to mark time while awaiting investment opportunities in the New Year. The November trade figures are certainly a great improvement on the previous month and point to a healthier financial position.

It was announced by Singer and Friedlander last week that O. and M. Kleemann have received sufficient acceptances of the bid for Erinoid ordinary and preference to enable the bid to be declared unconditional, subject only to the usual provisos of the resolutions at the Kleemann meeting being passed and permission obtained to deal in the new Kleemann ordinary and preference shares and debenture. At this juncture there is clearly no point in holding back and Erinoid shareholders should accept the bid. The closing date for the offer has been extended to 23 December.

1957 High	1957 Low		16 Dec.	Change on last two weeks
23/7½	16/4½	Albright & W. 5/-	17/6	+4½d
11/6	10/6	Anchor 5/-	10/9	—
1/3	1/1	Ashe 1/-	1/2	—
24/6	20/-	Bakelite 10/-	20/9	-6d
7/10½	4/9	Berk 5/-	4/9	—
36/-	19/6	Borax 5/- Dfd.	21/9	-1½d
10/9	8/10½	Bt. Chrome 5/-	9/9	—
13/10½	10/3	Bt. Glues 4/-	11/9	+6d
6/4½	4/9	BIP 2/-	5/1½	—
8/6	5/6	Bt. Tar 2/6	7/7½	+4½d
22/3	17/6	Brothertons 10/-	18/-	+6d
35/-	27/3	Bt. Xylonite	28/6	-1/3
4/4½	3/6	Coalite & C. 2/-	3/8½	-½d
60/3	45/9	Fisons	51/-	+1/-
43/-	24/-	Glaxo 10/-	35/3	+3d
9/6	7/7½	Hardman & H. 5/-	7/7½	-1½d
34/6	24/1½	Hickson & W. 10/-	29/3	—
46/6	36/1½	ICI	38/3	+6d
4/9	2/7½	Kleeman 1/-	2/10½	-6d
22/1½	14/6	Laporte 5/-	16/-	-3d
22/-	15/-	Lawes 10/-	15/-	+3d
19/3	12/4½	Monsanto 5/-	13/-	-9d
15/6	11/-	Reichhold 5/-	11/7½	-1½d
11/9	9/-	Yorkshire Dye 5/-	9/1½	-7½d

TRADE NOTES

Business contracts worth more than £500,000 both ways with China have been signed by Mr. F. R. H. Tollack, managing director of Biddle Sawyer and Co., an import-export house. The company will import raw materials and chemicals from China.

According to Mr. Tollack, who is on a trade trip to the Far East, trade prospects between Britain and Communist China were continuing to improve.

Nickel-base Alloys

The Langalloy R series of nickel-base alloys, have been developed by Langley Alloys Ltd., Langley, Slough, to provide a range of cast alloys that will handle nearly every mixture and condition met in modern chemical processing. The series can be supplied as castings for most types of equipment. A standard range of valves in these alloys is also offered.

Insect Repellent

A new repellent for cockroaches and cattle flies, which is claimed to be non-toxic to warm-blooded animals has been produced by McLaughlin Gormley King Co., Minneapolis, US, and is now available in the UK. Known as MGK Repellent 11, it is 2,3,4,5,-bis(△2-butylene) tetrahydro furfural.

Claimed to be even less toxic than pyrethrins, its use is recommended in conjunction with pyrethrins. Field tests indicate that the minimum period of repellency is four to five weeks.

International Engineering Link-up

Artos, of Hamburg, makers of textile finishing machinery, have joined the group formed last year by John Dalglish, Glasgow, and Proctor and Schwartz, Philadelphia. Object of this international alliance is to widen the scope of all three firms, who are now able to make full use of the designs and experience available in each. They will provide a full range of machinery to dry textiles, chemicals, food, ceramics, glue, gelatine and many other products.

All three companies will retain their individual identity and their flexibility to cope with the fast-changing conditions in the industries they serve. John Dalglish have been makers of textile machinery for more than 80 years.

Mikro-D Equipment

Pulverising machinery division of Metals Disintegrating Co., Summit, New Jersey, US, in association with the UK manufacturers of their equipment, George Adlam and Sons Ltd., Fishponds, Bristol, have formed Pulverising Machinery Ltd. to handle the marketing of the Mikro-D range of equipment. This range includes air conveyors, atomisers, dust collectors, pulverisers and rotary airlocks, etc. Adlam's laboratories at Bristol are being extended to give improved technical service facilities.

Norway Receives Carbide Plant Order

Carbide Industries Ltd., a subsidiary of British Oxygen Co., have placed an order with Elektrokemisk A/S, of Norway, for an electric carbide smelting furnace to be installed in the new carbide and acetylene plant which Carbide Industries are to build near Londonderry, Northern Ireland.

Construction of the plant is being undertaken by British Oxygen Engineering and preliminary work on the site has already begun. The factory is expected to be completed in about two years and it will be adjacent to a new power station now under construction by the Northern Ireland Electricity Board, and to the site recently purchased by the Du Pont Co., UK.

Testing Laboratories in New Welfare Block

LABORATORIES for the testing of raw materials, intermediate products and final products are included in the new catering facilities and welfare block opened recently by T. Wall and Sons Ltd. at Godley, near Hyde, Cheshire.

Apart from testing for purity, the laboratory also makes sure that ingredients will function properly during manufacturing processes. For example, the slightest trace of moisture in sugar would cause difficulties when it passed through the automatic handling system. The bacteriologist also checks that ingredients comply with his standards.

Equipment in the chemical laboratory includes a centrifuge by Boro Laboratory Appliance Co., muffle furnaces by Selas Gas and Engineering Co., a drying oven by Charles Hearson and Co., a vacuum oven by Townson and Mercer and a sifter by Henry Simon. Benches are of wooden construction, faced with Formica laminate. They were constructed by Norbury Joinery Co. In the instrument room is an Oertling Release-o-matic balance, a Baird and Tatlock balance, a pH meter by Cambridge Instruments, a Bellingham and Stanley refractometer, a Unicam SP 600 spectrophotometer and microscopes by W. Watson and Sons and Leitz.

Incubators for the bacteriological laboratory are by Laboratory Thermal Equipment and Charles Hearson and Co. The media preparation room is equipped with sterilising ovens by Laboratory Thermal Equipment, an electric autoclave by Baird and Tatlock and a Manesty water still.

The laboratories cover a total area of 2,070 square feet. Staff at present is 15 but it is expected that this number will rise to 20 in the near future.

Selecting a Suitable Preservative

PRESERVATION of toilet preparations containing non-ionic surface-active agents was the subject of a paper given recently by Mrs. D. L. Wedderburn at a meeting of the Society of Cosmetic Chemists. Her talk embodied the results of investigations on different types of non-ionic surface-active agents in conjunction with 24 preservatives.

The activity of many well-known preservatives is reduced in the presence of non-ionic surface-active agents and it is concluded that all products containing these agents require specially selected preservatives depending on the type and amount of non-ionics present.

Other factors governing the selection of a suitable preservative include: pH of the product, the type of emulsion or system to be preserved, the nature of the container, and the stability, toxicity and cost of the preservative.

ICI Sales Mission to Russia

A party of six technical salesmen from the dyestuffs division of ICI has just arrived back in this country after a week in Russia. They have been on a selling mission. Soviet scientists are reported to be interested in dyes developed for rubber in this country.

Deadly to insects

Harmless to animals

Pyrethrum-based insecticides

Pyrethrum P.Y.R. is harmless to animals and human beings. It can be used safely in close proximity to foodstuffs.

Pyrethrum P.Y.R. combines very high knock-down with effective killing power. And with suitable synergists these effects can be markedly enhanced.

Insecticides based on African Pyrethrum are particularly effective in dealing with flying insects and with pests that attack stored products. They do a first-class job in public health work and in the protection of food supplies.

Insects do not develop resistance to Pyrethrum P.Y.R. as they do to many other insecticides.

Detailed information about African Pyrethrum and advice on its use for domestic, industrial and other purposes are available on request.

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NEW PATENTS

By permission of the Controller, HM Stationery Office, the following extracts are reproduced from the 'Official Journal (Patents)', which is available from the Patent Office (Sale Branch), 25 Southampton Buildings, Chancery Lane, London WC2, price 3s. 3d. including postage; annual subscription £8.

Specifications filed in connection with the acceptances in the following list will be open to public inspection on the dates shown. Opposition to the grant of a patent on any of the applications listed may be lodged by filing patents form 12 at any time within the prescribed period

ACCEPTANCES

Filters for liquids. Vickers-Armstrong (Engineers), Ltd. **789 323**

Production of polyacetals. Deutsche Solvay-Werke Ges. **789 458**

Synthetic lubricants. Esso Research & Engineering Co. **789 459**

Diol perfluoro esters and diols therefrom. Esso Research & Engineering Co. [Addition to 776 073.] **789 388**

Purification of phenothiazine. Esso Research & Engineering Co. **789 390**

Producing cellulose pulp from angiosperms and gymnosperms. Beauvais, A. **789 325**

Methods of sealing a tubular glass neck portion to a glass wall. General Electric Co., Ltd. **789 612**

Epoxide resins. Bakelite, Ltd. **789 392**

Colouring of textile materials with vat dyes. British Celanese, Ltd. **789 547**

Production of ethylene bis-thiuram monosulphide. Robinson Bros., Ltd. **789 470**

Production of *L*-glutamine. International Minerals & Chemical Corp. **789 328**

Derivatives of naphthalene and the manufacture thereof. Wellcome Foundation, Ltd. **789 561**

Metal salts of phosphosulphurised hydrocarbons. Esso Research & Engineering Co. **789 474**

Lubricating oil additives. Esso Research & Engineering Co. **789 396**

Manufacture of titanium. Imperial Chemical Industries, Ltd. **789 398**

Preparing a dispersion of an alkaline earth metal carbonate in an oil. Shell Research, Ltd. **789 562**

Phosphate and salts thereof and the manufacture of same. Roche Products, Ltd. **789 563**

Apparatus for admixing two liquids in variable predetermined proportions. Robinson, G. S. **789 331**

Manufacture of germanium. Ericsson Telephones, Ltd. **789 625**

Purification of elementary boron. Borax Consolidated, Ltd. **789 403**

Dyeing of highly polymeric esters. Imperial Chemical Industries, Ltd. **789 333**

Polyol alcoholates. National Lead Co. **789 566**

Production of soluble anhydrous alkali metal silicates. Diamond Alkali Co. **789 335**

Recovery of titanium tetrachloride from chlorination gases. Fabriques de Produits Chimiques de Thann et de Mulhouse. **789 552**

Method of making thin flat electroded ceramic elements. Erie Resistor Corp. **789 336**

Production of foam materials. Bauer, J. **789 481**

Manufacture of unsaturated ketones. Hoffmann-La Roche & Co. AG., F. **789 411**

Production of dehydrovitamin A ethers and esters. Badische Anilin- & Soda-Fabrik AG. **789 362**

Steroids and the preparation thereof. Pfizer & Co., Inc., C. **789 363**

Acrylamide. American Cyanamid Co. **789 503**

Preparation of thiadiazole-sulphonylhalides and their conversion to sulphonamides. Chinoin Gyogyszer es Vegyeszeti Termekek Gyara R. T. **789 583**

Magnesium anode primary cell. Dow Chemical Co. **789 525**

Bleaching cotton. Du Pont de Nemours & Co., E. I. **789 585**

Preparation of tri-isopropylbenzene. Mid-Century Corp. **789 366**

Production of compounds of the vitamin A series. Badische Anilin & Soda-Fabrik AG. **789 437**

Mercuri-N-propylurea derivatives. American Home Products Corp. **789 369**

Magnesium anode dry cell. Dow Chemical Co. **789 526**

Open to public inspection on 29 January

Production of denser graphite. United Kingdom Atomic Energy Authority. **789 663**

Processes and apparatus for exchanging heat between solid particles and gases. Smidth & Co., Aktieselskab, F. L. **789 961**

Manufacture of shaped structures of improved dyeing capacity based on polymeric $\alpha\beta$-unsaturated nitriles. Farbwerke Hoechst AG. **789 664**

Methods of and apparatus for burning cement, lime, ores and the like. Smidth & Co., Aktieselskab, F. L. **789 963**

Selective reduction of polyoxosteroids. National Research Development Corp. [Cognate application 8496.] **789 974**

Method of and apparatus for gas generation. Wyandotte Chemicals Corp. **789 960**

Producing oximes by the reduction of nitrocycloparaffins. Imperial Chemical Industries Ltd. **789 666**

Process for drying moist salt mixtures, produced in the manufacture of compound fertilisers and improved salt mixtures prepared by such a process. Gewerkschaft Victor. **789 978**

Process for the manufacture of terephthalic acid. Farbwerke Hoechst AG. **789 809**

Manufacture of organic metal compounds. Farbwerke Hoechst AG. **789 983**

Magnesium base alloys. Magnesium Elektron Ltd. **789 984**

Ethyl esters of thiolcarboxylic acids. Imperial Chemical Industries Ltd. **789 985**

Wax preparations. Farbwerke Hoechst AG. **789 740**

Phenthiazine derivatives and process for their preparation. Soc. des Usines Chimiques Rhone-Poulenc. [Cognate applications 5348 13952 and 22854/57.] **789 811**

Connector means for permitting fluid flow to or from a container. Alumasc Ltd. and Lewis, E. C. **789 729**

Purification of crude benzene. Scholven-Chemie AG. **789 986**

Catalytic pressure refining of crude benzene, crude gasoline, crude kerosene and crude gas oil. Badische Anilin- & Soda-Fabrik AG. **789 988**

Evaporation and/or boiling of aqueous sugar solutions. Geigy Co. Ltd. **789 744**

Inlet or out means for permitting flow-fluid into or out of a container. Alumasc Ltd. and Lewis, E. C. [Divided out of 789 729.] **789 730**

Dispersions of inorganic metal compounds in lubricating oil and methods of making same. Continental Oil Co. **789 820**

Production of ketoximes. Mueller, E., Metzger, H., and Fries, D. **789 731**

Process for the upgrading of cracked naphtha. California Research Corp. **789 679**

Diammonium phosphate fertiliser production. Dorr-Oliver, Inc. **789 747**

Compounds of the isonicotinylhydrazone of sulphonyl-benzaldehyde with antibiotic bases and process for their production. **789 683**

Method and apparatus for manufacturing pellets from fusible materials. Badische Anilin- & Soda-Fabrik AG. **789 685**

Portable water-distillation apparatus. Lea Bridge Industries Ltd. **790 004**

Oxide coated cathode supports. Compagnie Generale de Telegraphie Sans Fil. **789 826**

Purification of thorium. United Kingdom Atomic Energy Authority. **789 894**

Diisocyanate modified polyester foams. Hudson Foam Plastics Corp. **789 754**

Process of curing organosilicon compounds. Midland Silicones Ltd. **789 686**

Insulating tank for cold boiling liquids. Constock Liquid Methane Corp. **789 755**

Frostproof aqueous dispersions of copolymers. Newby, H. (Chemische Werke Hüls AG.) **789 688**

Arc melting furnace. Imperial Chemical Industries Ltd. and Robinson, P. J. **789 895**

Composition for temporarily sterilising soil. Stauffer Chemical Co. **789 690**

Unsaturated aldehydes, acetals and ether acetals and a process for the manufacture thereof. Hoffmann-La Roche & Co. AG, F. **789 693**

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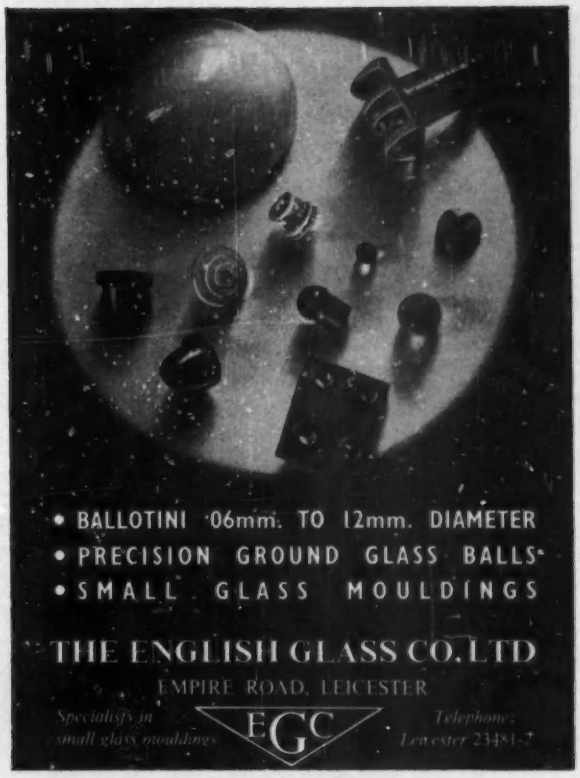
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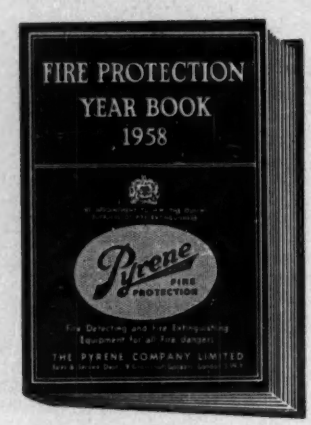

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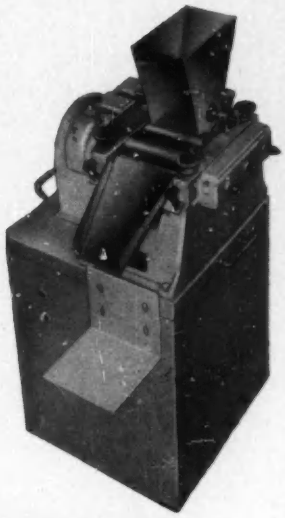

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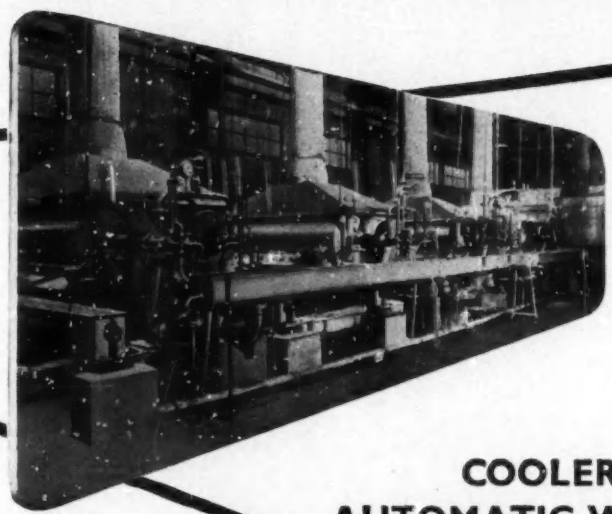

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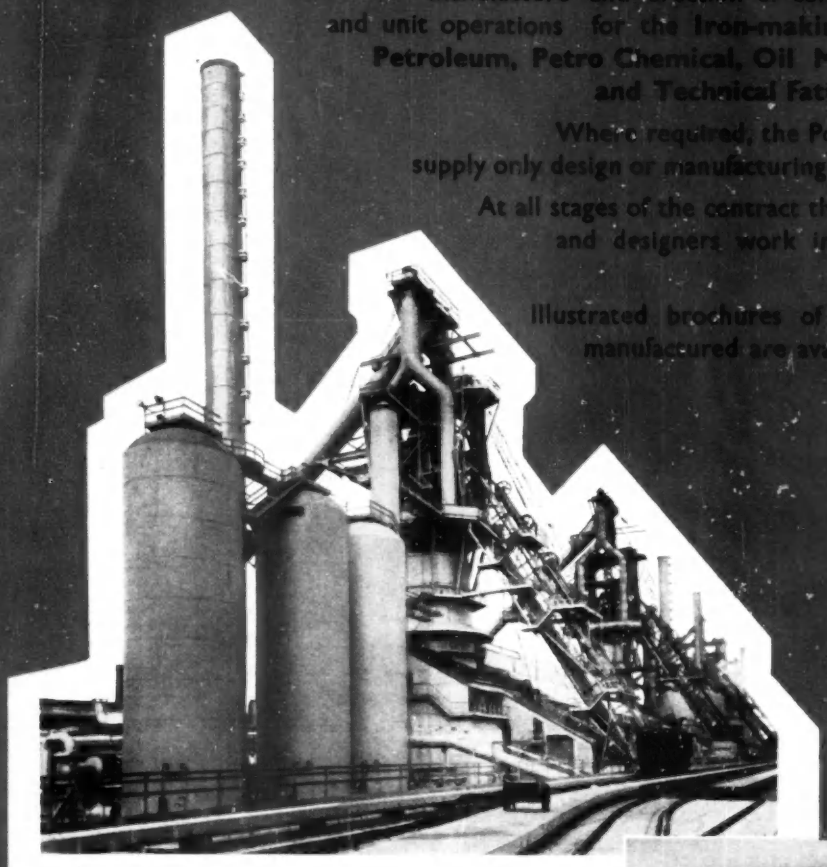

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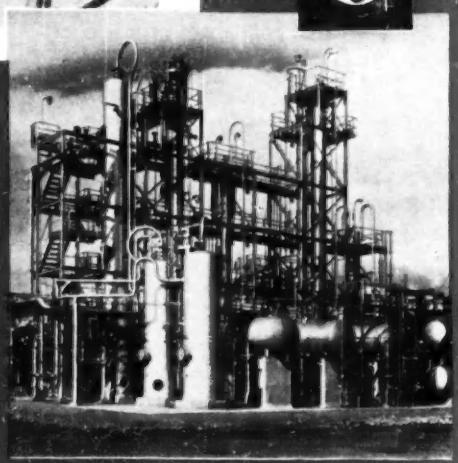

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